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CHRISTMAS 1959

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Accident Prevention

Periodically, there are launched such laudable activities as " Safety-first Weeks." For these events, quite often shock-tactics are resorted to by the issue of various types of posters featuring people who are lame or blind as a result of an industrial accident. It would be almost a coincidence if, as a result of the showing of a poster, the specific type of accident covered by it was prevented. The major beneficial influence in the general campaign against accidents has been a long series of Factory Acts and the thinking they have generated in industrial circles. High ranking amongst these is the insistence on good-housekeeping principles, as in the grand total of accidents it is not those which " hit the headlines " in the local newspapers that numerically are serious, but the daily ones caused through slipping, being hit by something falling from a height, or just bumping into an unnoticed projection.

Thus, it is the permanent system of law which has done most for the reduction of painful and expensive industrial accidents, and this fact has apparently inspired American foundrymen through the Gray Iron Founders' Society—one of their employers' federations—to take the matter a step further. Thus, their safety committee has issued a simplified " safety check list " for use by management when making periodic inspections. The check list also includes provision for rating safety performance, as well as space for noting discrepancies, comments or rectifications.

What appeals to us is that a committee of practical men should have put their combined experience at the disposal of their colleagues in the industry in a form where it could do most good. Just as the attitude " familiarity breeds contempt " is a cause of accidents, so, too, the repeated periodical inspection of a shop, even though accident prevention is uppermost in the mind, induces a sort of mental myopia. A bad divergence from good practice can easily make an inspector forget to look out for minor faults. The actual filling up of forms and putting an OK to a question as to whether the gangways are clear does perhaps make one take a second look. We are unfamiliar with the make up of this safety check list which lack, no doubt, our American friends will remedy, but we are convinced it is a logical and worthwhile step towards reducing accidents.

Presentation Nowadays Almost Unique

An unusual ceremony took place recently at the works of Osborn Foundry & Engineering Company, Limited, Sheffield. This was the presentation made to Mr. R. F. Horton by shop stewards on behalf of all employees in appreciation of the work done by all the company's staff engaged in commercial activities. It was, in addition—so the citation read—a gesture of the company's personal appreciation and regard for Mr. Horton, and an acknowledgment of all he has done, not only in the field of commerce, but in other activities from which all the employees and staff have benefited. The presentation took the form of a stainless-steel hand holding two stainless-steel castings of a fish and a loaf, mounted on a plinth. On the side of the plinth, there is a stainless-steel plate which bears the following inscription:—

Presentation to R. F. Horton, Esquire, by shop stewards of the Osborn Foundry & Engineering Co., Ltd., on behalf of all employees, in appreciation of his efforts to obtain work and from which all have derived much benefit. In presenting this "Symbol" the employees desire to incorporate into this act of appreciation all the people engaged in similar duties and the Directors of Samuel Osborn & Company Limited who support all this effort.

In making the actual presentation, one of the shop-stewards explained that the "symbol" incorporates the company's trade mark of the "Hand and Heart"; the wings denote travel and the contents of the hand the benefits all receive. This presentation might be considered unique in this modern industrial age, he went on, but it is, in fact, a continuation of similar presentations which were once quite frequent. It is regarded as a "living" token, offered with the greatest sincerity, he concluded.

Mr. R. F. Horton, director of Samuel Osborn & Company, Limited, admiring the symbolic "hand, fishes and loaf" casting in stainless-steel presented to him by fellow employees.

Left to right: Mr. Eric Nicklin; (Mr. R. F. Horton); Mr. William Marsden; Mr. Harold Twigg; Mr. James Taylor and Mr. George Hayward.

New Technology Award

Detailed arrangements for the award of Member of the College of Technologists (MCT) were announced by the National Council for Technological Awards last week. The award follows the Diploma in Technology and is given to those who complete a substantial programme of work of value to industry carried on jointly in industry and a college.

Commenting on the arrangements, Lord Hives, chairman of the Council and of the governors of the College and former chairman of Rolls-Royce, Limited, said the new award provided a qualification in technology equivalent to a PH.D. degree of a university. It carried into the field of research that close relationship between academic work and practical experience which was one of the distinguishing features of the Diploma in Technology.

Lord Hives said it was of special significance to-day when Britain must have designers and manufacturers of the highest calibre to increase living standards at home and to play her full part in the progress of the less-developed countries of the Commonwealth.

Research in Machine-tool Industry

An undertaking to give further consideration to the type of research organization most suitable to the industry has been given by the Machine Tool Trades Association. This was announced after a meeting on December 9 of the Department of Scientific and Industrial Research with MTTA representatives. The Association also agreed that much closer co-operation was necessary between engineers and designers in industry, on the one hand, and the research work of universities, colleges, and research institutions on the other.

Further meetings between the MTTA and the DSIR are to be held to discuss specific aspects of research, education, and design. They are the outcome of the recent DSIR survey of the machine-tool industry's research and education facilities.

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Madrid Congress Papers

Short Synopses of the World's Principal Contributions to International Foundry Technology

A survey of the 32 papers presented at Madrid, reveals that thirteen deal with ironfounding, six with non-ferrous founding, five with steelfounding, three with moulds and moulding materials, and five with general subjects. It is interesting to note that major emphasis is still maintained on the iron side, with spheroidal-graphite material. In the papers on steel, casting defects are considered to the virtual exclusion of other subjects. The papers summarized in this issue are those printed in English (eleven), and Spanish (five). The concluding section, which will follow next week, will contain the seven papers presented in French, and the nine papers given in German (the other official languages of the Congress). The Congress was reported in the November 12 JOURNAL.

Printed in what follows are summaries of the Papers presented at the various technical sessions of the 26th International Foundry Congress, held in Madrid last October. For the sake of convenience, the summaries of papers in English are quoted first, followed by those in the other three official languages—Spanish, French and German. (In each case the language of the paper is indicated.) All the papers have been assembled into one loose-leaf volume, and readers interested in acquiring a set* should write to the Congress Secretary, José Andrés, *Instituto del Hierro y del Acero, Ciudad Universitaria,* Madrid.

Grain Structure in Sand Castings

By Dr. V. Kondic, B.Sc. (British Exchange Paper)

The term " cast structure " is defined in terms of macro- and micro-phenomena normally encountered in alloys in the cast state. The concept of the grain or crystal is then singled out as one of the key features of the cast structure, and the theoretical problems connected with the explanation of the origin of grains are discussed. The concepts of nucleation and crystal growth as the basic elements of the theory of the origin of cast structure are then outlined, and examples of the practical application of this theory in foundry practice are given. The importance of grain structure in controlling casting properties for two typical groups of alloys, *viz* solid-solution type and eutectics, is then discussed. The point is made that, apart from the grain size, the size, shape and distribution of other constituents within grains also have to be considered.

Aluminium Eutectics

Some recent work on the problem of explaining certain structural changes observed in commercially-pure aluminium and aluminium-silicon eutectic is then reported on. Fine grain structure, observed in commercially-pure aluminium poured at temperatures near the melting point, was found to be due to turbulence. The very fine or modified structures obtained with aluminium-silicon eutectic, either by rapid cooling or by small additions of sodium, were found to be formed by essentially the same process, as far as the basic origin of these structures is concerned.

In the discussion on the paper, two general points were made: first, that the present state of the theories of nucleation and crystal growth is inadequate to deal with many problems encountered with cast structure in foundry practice, and second, that the problem of the influence of grain structure on the properties of castings is still largely undetermined.

Production of Castings in Tin-Bronze

By Masataka Sugiyama (Japanese Exchange Paper)

Gross shrinkage defects seldom occur in tin-bronze castings if melting is carried out carefully. This seems to be due to the fact that shrinkage cavities in bronze castings are nearly always so microscopically fine and dispersed that they are not noticeable. The author's object was to investigate these shrinkage defects, and determine the effect of riser and end portions of castings on soundness of tin-bronze castings. Castings were produced under various conditions, and X-ray inspection carried out using the thin slices cut from each specimen. The occurrence of porosity in the castings, the effect of risers, and the cooling action of end portions of the castings was studied. Similar experiments were carried out with brass and aluminium-bronze castings, for purposes of comparison.

Results

The following results were obtained. In tin-bronze, feeding of metal during solidification is difficult, because of its long freezing-temperature range, and fine shrinkage porosity is inevitable. Shrinkage defects are varied by the mode of crystalline growth, and the growth of equiaxials is accompanied by dispersed microporosity. Columnar crystals cause centreline shrinkage cavities. Feeders have little effect upon the soundness of castings so far as shrinkage cavities are concerned. In columnar-crystal structured castings, shrinkage cavities are concentrated into the centreline portion. The sound end zone is influenced by pouring procedure, horizontal pouring being more effective than

* Price available on application.

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vertical pouring. With vertical pouring, a top gate is more desirable than a bottom gate, and pouring should be done slowly.

Oxidation of Niobium

By Tor Hurlen (Norwegian Exchange Paper)

By means of semi-continuous gravimetric and volumetric measurements, the rate of reaction of niobium with oxygen as a function of time has been determined at temperatures of 150, 200, 250, 300, 350, 375, 400, 425, 450, 500, 550, 600, 650, 700, 750, 800, 900 and 1,000 deg. C., and, for most of the temperatures, at oxygen pressures of 760, 100, 10, 1, 10^{-1} and 10^{-2} mm. of Hg. This research work was followed by investigations of oxidized specimens by means of X-ray diffraction, electron diffraction, electron microscopy and metallographic techniques. Some continuous X-ray-diffraction measurements directly on specimens undergoing oxidation have also been made. Niobium has been found to react with oxygen in a rather complex and unusual way, but a close correlation seems to exist between the oxidation-rate curves and the oxidation products formed.

A discussion is presented on this matter which includes the effects of temperature, oxygen pressure, and time on the oxidation behaviour of niobium. Oxidation is already appreciable at temperatures of 200 to 250 deg. C. The dissolution of oxygen into the niobium metal lattice plays an essential role during the initial stages of oxidation. Two different suboxides (NbO_x and NbO_y) have been detected among the oxidation products, in addition to the more well-known oxides of niobium (NbO, NbO_2 and Nb_2O_5). Oxide whiskers appear on top of the oxide scale on sheets oxidized at 800 to 1,000 deg. C. This work has been sponsored by the Wright Air Development Centre of the Air Research and Development Command, United States Air Force, through its European office.

Internal Tearing in Steel Castings

By Isaac Minkoff (Institute of Technology, Haifa), Charles W. Briggs (Steel Founders' Society of America) and Howard F. Taylor (Institute of Technology, Massachusetts) (Israeli Exchange Paper)

Stresses acting in the cross-sections of cast-steel components have been shown to play an important part in determining tearing behaviour, particularly in the presence of shrinkage cavities. This has been investigated for castings of square and rectangular section, and also in the case of rings and cylinders.

For rings joined to cylinders, tearing is determined by whichever stress system predominates, that acting in the ring, or that acting in the cylinder—this has been initially investigated, and may play a significant part in overall tearing behaviour. It has been considered in relation to bore cracking of steel castings and the results corroborated and added to previous findings by Taylor *et al**. The influence of inadequate feeding, and ensuing shrinkage, on the severity of bore cracking has been demonstrated.

The present investigation has not attempted to investigate the influence of core strength on tearing behaviour. When considering the tearing of steel castings, all contributory stress systems must be considered. The observations presented in this paper are intended rather to draw attention to stress systems due to temperature distribution in the cross-section of castings, and their intensification with insufficient feeding.

Ferro-alloys and Inoculants for High-strength Grey Cast-iron

By Howard H. Wilder (American Exchange Paper)

The introduction to this paper consists of a historical background to the field of grey-iron foundry operations. A description of the products and chemistry involved is given, and microstructures encountered are reviewed. Typical examples of American inoculation practice for production of 13.4, 15.6 and 20.0-tons per sq. in. tensile-strength irons are given, with chemical analyses and metal-charge mixtures. The production of high-strength grey cast-irons, by using inoculants and alloying materials for 13.3 and 17.8-tons per sq. in. tensile irons, is also presented. Conditions under which graphitizing and stabilizing-type inoculants can be used are indicated, and sizes of addition agents and precautions necessary for good practice are detailed. Alloys for achievement of specific results are summarized in a table for ready reference.

Typical high-tensile-strength grey cast-irons that are representative of American operations are shown, with their strengths before and after additions are made. The effects of minor elements present in inoculants, and the part they play, are outlined by the author. Future considerations of materials, and research work needed, are also commented upon.

Ageing of Aluminium/Magnesium Casting Alloys

By L. J. G. Van Ewijk (Holland)

Earlier papers by the author on the subject of ageing of aluminium-magnesium casting alloys have dealt with:

The influence of various heat-treatments on alloy properties.

Room-temperature properties after heating to elevated temperatures for various periods.

Change of properties at ageing temperatures greater than 100 deg. C.

Change of properties at ageing temperatures after exposure to these temperatures for various lengths of time. Also, a general survey of the structure of these alloys before and after these ageing tests was previously given.

* See *Transactions*, American Foundrymen's Society, **54**, 670.

In this paper, a more extensive study of the structural changes occurring in these casting alloys is described, and from these data tentative conclusions are drawn. The samples for these investigations were taken from (*a*) test castings that had served for the three previous papers mentioned, and (*b*) from additional castings specially produced for the tests described in the present Paper.

Penetration of Low-melting-point Metals into Foundry Sand

By K. Fursund (Danish Exchange Paper)

The investigation of penetration phenomena in connection with iron is comparatively difficult, as changes take place in the sand during penetration. In metals having a low melting point, the degree of penetration should be determined by physical and thermal conditions only. This investigation deals almost exclusively with low-melting-point metals, so it seems that physical conditions must also be predominant during penetration of iron.

The experiments were arranged so that penetration into the sand could be observed through a glass wall while it was happening. This experimental method has furnished particulars of the penetration mechanism which otherwise could only have been obtained with considerable difficulty. Metal penetration takes place under conditions of disequilibrium, the movements occurring in jumps. For the pure metals and eutectic alloys these jumps take place as soon as the metal surface is molten. The molten metal, even at melting point, can penetrate somewhat into sand, even though the sand is considerably colder than the metal.

Hot-tearing in Steel Castings

By Kurt Beckius, Merton C. Flemings, and Howard F. Taylor (Swedish Exchange Paper)

A simple method was developed of testing the influence of variables on the susceptibility of steel castings to hot-tearing. A test casting which could be moulded in a standard flask was used, susceptibility to hot-tearing being measured without special instrumentation. Variables tested were sand strength, chemical composition of the steel, and pouring temperature. Observations were made on both external and internal hot-tearing. Design changes made included variations of fillet radii and length of constraining member, and the use of brackets. The results of this investigation helped to explain (1) the relationship between feeding, casting design and external hot-tearing, and (2) the formation of internal hot-tears in steel castings. It is concluded that both internal tears, and open external tears, can be eliminated by the provision of adequate feeding.

Blast-furnace Pig-irons for Nodular-graphite Cast-iron

By Isao Aoki (Japan)

Pig-irons for nodular cast-iron have been produced since 1953 in the blast-furnace of the Kamaishi Iron Works. Sometimes, in the past, these irons were found to be unsuitable, although their chemical analyses were within specification. In an investigation carried out by the author the following results were obtained: The special elements such as Sn, As, Sb and Pb, etc., which entered the pig-iron from the ore used, were found to have a deleterious effect on the formation of nodular graphite. This effect was emphasized by the 0.05- to 0.1-per cent. titanium which was always present in the pig-iron. It was found possible to produce much better pig-iron by using raw materials which contained harmless amounts of the above elements.

Manufacture of High-duty Iron

By N. G. Chakrabarti (Indian Exchange Paper)

There are about 1,800 grey-iron foundries in India, producing agricultural implements, cast-iron pipes, flanges, fittings and castings for general engineering purposes. With the growth of the automobile industry there, manufacture of cylinder blocks, brake drums, clutch housings, etc., has become a necessity. This work cannot be undertaken by ordinary foundries, since the metal employed is of the high-duty type, having not only high tensile strength but also good wear-resisting properties. The term "high-duty" cast-iron is usually employed to indicate grey cast-irons that have a tensile strength greater than 17.9 tons per sq. in. These irons are costlier to produce than ordinary iron, the strength of which is generally within the range of 9.0 to 15.6 tons per sq. in.

Filming the Flow of Metals in Shell Moulds, using an Image Intensifier

By K. Shobayashi and K. Okamoto (Japan)

To obtain good castings it is important to understand how molten metals flow in the mould. Much research has been done on this subject, some investigators having endeavoured to simulate the flow of metals by observing the movement of waxes and mercury in transparent moulds. The authors of this paper have successfully filmed the continuous flow of metals in moulds by using an X-ray image intensifier originally manufactured for medical studies by the X-ray department of their laboratory. After many experiments to find a suitable film and camera for the fluorescent image, 8-mm. and 16-mm. films of the flow of metals and occurrence of blowholes and slag inclusions were taken.

Nodular Cast-irons inoculated with Cu/Si/Mg Alloys

By F. Rodriguez Yufera and J. Orland, S.J. (Spain) [In Spanish]

A series of tests on castings inoculated with copper-magnesium alloys showed that the mechanical characteristics of the material are very homogeneous, the tensile failure loads being kept between

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25.4 and 31.7 tons per sq. in. in the as-cast condition, or with heat-treatment (in which case elongations of from 5 to 10 per cent. are obtained). The fatigue limit by rotatory transverse, and the Young's modulus, are very high, especially the latter, the value of which is comparable to that of steel, showing that the material has good elastic qualities which make it suitable for the construction of machines, in spite of the fact that resilience tests may have given comparatively low figures. This has no marked significance in determining a material, in view of the measurement errors in the determination of the energy which are subject to the test-piece conditions (dimensions, macrostructures), as the dynamic characteristics are a function of the elastic properties. With special treatments the material can be improved, so that it can withstand the greatest dynamic stresses.

Conclusions

A description is given of the tests, and it is concluded that copper, which is much cheaper than nickel, can replace the latter, which is in very short supply in Spain. It is also decided that copper alloyed with magnesium and silicon can be used for producing spheroidal-graphite castings of excellent mechanical and structural properties, and, even though its characteristics are not generally so high as those of nickel, they are, however, of a sufficiently high level to make the alloy quite suitable for normal industrial applications.

The Friction Angle in "Green" Moulding-sands, and its relationship to Technological Properties and Hydration of Clays

By J. Navarro Alcacer (Spanish Exchange Paper) [in Spanish]

In this work the term "internal friction angle" derived from Mohr's circle theory has been introduced, for a study of moulding sands. It is suggested that this can numerically account for the so-called "flowability" of moulding sands. A short review is given of some proposed methods for measuring "flowability," and theories on the hydration process and bonding effect of clays are also discussed. The measurement of the angles of internal friction for the materials tested is next considered, and some usual figures for these angles, taken from literature on the Science of Soils, are given.

Index of Flowability

As an index of flowability, the number ψ, inverse of the friction angle, has been adopted, and the relationships between strength (σc) and flowability number ψ investigated for several sand-clay-water mixtures. For increasing amounts of water a point (45 to 65 per cent. H_2O) is reached where strength decreases and the value ψ seems to increase, as if announcing the appearance of the lower limit of plasticity (—100 per cent. H_2O). The variation of permeability in terms of changing flowability has also been studied, and these results are interpreted on the basis of the hydration theory of clays.

Influence of Feeder-heads on Costs of Castings

By Dionisio Escorsa Civis (Spain) [in Spanish]

The influence of size of sprue and riser on the cost of metal in a finished casting has been studied. It seems evident that the cost of metal of castings having the same weight will be higher in the ones requiring a heavier gating. If the costs for these different percentages are calculated, and likewise the ratio between the weights of the parts concerned and their gates, a chart can be made which will serve to determine directly the cost of the metal, with no further calculation, of any casting if its weight and that of one of its gates are known (provided the prices of materials and labour remain unchanged). The curve in this chart enables one to calculate quickly the cost of the metal in a casting which has to be repeated one or more times. The cost of the metal in the ladle can also be easily determined, as it is simply the cost of the casting without gates.

Improving the Modulus of Elasticity in Cast-irons

By Alberto Solé Amat (Spain) [in Spanish]

In this Paper the author emphasizes the importance of knowing the elasticity modulus of a cast iron, since it is a true criterion for estimating the quality of the material. In order to reveal the factors that determine it, several melts were made, some of them with changing diameters, with the aim of observing the influence of the cooling speed, the composition, the addition of inoculants, and other possible elements. In each of the casts and in each of the sections, there was determined, apart from the elastic modulus, the hardness, tensile strength, degree of eutectic saturation, and the chemical composition. The study was completed with a microscopic examination. The results obtained have been duly compared and translated into graphs, in order to clarify the conclusions drawn.

Segregation of the Alpha/Delta Eutectoid in Copper/Tin Alloys

By Francisco Joanxich Ayma (Spain) [in Spanish]

In this paper the massive formation of the alpha/delta eutectoid in Cu/Sn alloys cast in sand moulds is studied, and means of overcoming this defect suggested.

PARTICULARS ARE AVAILABLE from the Board of Trade, Export Services Branch, Lacon House, Theobalds Road, London, W.C.1, quoting reference ESB/28993/59, of an enquiry for the supply of Meehanite cast-iron sluice valves of various types for the Central Electricity & Water Administration, P.O. Box No. 1380, Khartoum, Sudan. (Tender No. CEWA/W/21/59.) The closing date for tenders is December 31.

Cupola Instrumentation

Progress Report from the Foundry of Geo. Salter, Limited.

The assessment of foundry instrumentation as an aid to the solving of production problems, is the basis of a "success" story from Geo. Salter Limited of West Bromwich, following the installation (Fig. 1) of a John Thompson cupola meter* Salter's business was founded in 1760, and their foundry, which had then been in existence for some years, was acquired 75 years ago. For the last ten years, modernization of the foundry has taken place in stages, but a major melting problem remained until a year ago when the cupola meter was installed. Serving the dual purpose of controlling the combustion draught and recording the variations in cupola conditions, the meter comprises a basic flow-mechanism with control equipment indicating and recording flow and air-pressure at the wind-belt. As a result, complete cupola control has been effected, and many of the difficulties which had hampered production have been eliminated.

Blast restriction at the beginning of a cupola blow, resulting as it did in cold metal and, when tapping, in a "hard hole," was the most serious brake on output. By assessing and controlling the required rate of air flow necessary for any weight of coke charge, the new cupola meter has proved that, for efficient melting, each of the Salter furnaces must be charged to a point 18-in. below its sill. Thus, four instead of the full five charges must be used when melting starts. When fully charged each of the furnaces carries 22 cwt. of metal and in neither of them has a hard hole been experienced since the introduction of the instrument.

* See JOURNAL, September, 10, 1959.

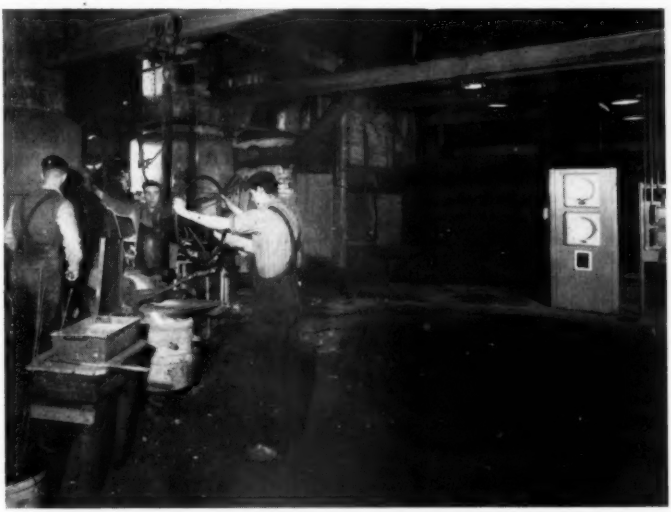

FIG. 1—*Collecting metal at the cupola spout at Geo. Salter's foundry, West Bromwich; on the right is the control instrument.*

Other Advantages

As an outcome of information provided by the new system, costs, both direct and indirect, have been drastically cut. Whereas interrupted melting was a commonplace, constant melting has now taken its place so that casting is possible at all times of the working day, and furnace shutdowns are avoided at, say, lunch times and during similar breaks in working hours. A pronounced saving in coke consumption has been recorded and maintenance costs have been reduced, mainly because of the controlled conditions under which the furnaces now operate. By such control, cupola wear has been reduced to a minimum and, consequently, less re-lining is necessary. The output of the Salter foundry—approximately 1,600 tons of machineable grey-iron castings per year—is used in the manufacture of the company's weighing machines and in fulfilling contracts for a wide variety of industries.

Telcon Equipment for Japan

Three electro-hydraulic windlasses with separate capstans are being manufactured by the engineering division of the Telegraph Construction & Maintenance Company, Limited (Telcon), at its Greenwich works. The equipment is being made for installation in 46,000-ton tankers being built by the Kawasaki Dockyard Company, Limited, Kobe, Japan, for the Inter-Ocean Shipping Company, Nassau, Bahamas, to the design of G. T. R. Campbell & Company, Montreal.

Because the tankers will be unloading in unusual conditions on the north-west coast of America, stern windlasses and capstans are to be provided as an essential part of their equipment. A hydraulic mooring capstan is also provided as a separate unit.

"Steam Weekend" in Birmingham

Working exhibits to be shown at the City Museum and Art Gallery of the Department of Science and Industry at Birmingham during the weekend of January 2 and 3 will include a Massey steam hammer (1873), a Galloway uniflow engine (1924), an Amos compound beam engine (1864), and a Tangye Colonial engine (1890). It is also proposed to run three hot air engines and a gas engine. A Pollitt & Wigzell horizontal compound engine with Corliss valve gear will be run for short periods each day.

The beam pumping engine, made by Boulton & Watt in 1777 for canal pumping at Smethwick and removed to Ocker Hill, Tipton, in 1897 has recently been dismantled, and it is hoped to show a colour film of the dismantling of the engine during the "Steam Weekend."

Equipment and Supplies

Sedimentation Prevention

A problem frequently met in foundry and enamel-shop spraying of coatings, the ingredients of which settle rapidly out of suspension, is the rapid clogging on standing of pipelines carrying the material. Often spraying cannot be resumed without considerable waste of time and spraying material.

Alfred Bullows & Sons, Limited, Long Street, Walsall, claim to have solved this problem by using their "Pogo" pump to feed the material through a standard fluid hose to the spray gun, to which is attached a "Y" piece. From the "Y" piece a second length of hose provides a return flow to the pump and hence to the container of material, which is itself kept agitated by the constant flow-and-return of material. This very simple arrangement has now been operating for just over 18 months, running day and night, and it is reported possible to pick up the gun and spray material at any time, without any stoppage at all. The equipment operates off the existing air line, using less than three cub. ft. per min. of air at pressures as low as 30 lb. per sq. in. Another possible application of this new development is in the machine-tool industry where "filling" and finishing of castings is carried out on a large scale, and also where metallic paints are used.

Ultrasonic Thickness Gauge

"Vidigage," an ultrasonic resonance gauge, made by the Branson Instrument, Incorporated, Connecticut, USA, has recently been put to use at the plant of Republic Aviation Corporation, Farmingdale, Long Island, New York State. It is used to check possible core shift in a complex magnesium-alloy canopy casting, which forms part of a newly designed American fighter bomber. Permissible core shift is only ± 0.030 in., to avoid any possibility of excessive or unequal stresses on the aircraft when in service.

The new gauge operates with access to only one casting surface, so that all vital dimensions are easily checked. It is claimed that more accurate measurements are obtained with the gauge than with calipers or other measuring devices.

Principles of Operation

Vidigage operators require very little training, since the probe is merely slid across the outer surface of a casting, the varying wall thicknesses being shown on a direct-reading scale (see Fig. 1). Even intricate sections are easily measured, it is claimed, and the thickness readings are instantaneous and accurate to within 0.1 to 1 per cent., depending on the material being tested. Ultrasonic thickness gauging is based on the fact that the natural frequency of a metal or plastic varies inversely with its thickness. Continuously varying high-frequency vibrations (0.7 to 25 megacycles) are transmitted into the material under test through a transducer. The reflected waves are amplified by the instrument, and resonant frequencies (or harmonics) show up as vertical traces on a cathode-ray screen. A suitably calibrated scale placed in front of the screen permits thicknesses to be read directly.

Safety Belt

Barrow Hepburn & Gate, Limited, Grange Mills, Bermondsey, London, S.E.1, have designed a new lightweight safety belt for use by builders' erectors and maintenance engineers. It is claimed that the belt is easy and comfortable to wear, and that it is very much stronger than the more conventional types at present in use.

A dramatic demonstration of the new belt was carried out recently 250 ft. up on the new Shell building in London, in co-operation with the Cleveland Bridge Construction Company, and Sir Robert McAlpine & Sons, Limited. "Spidermen" from both companies were present.

Lifting Magnet

Rapid Magnetic Machines, Limited, Lombard Street, Birmingham, 12, have introduced a new lifting-magnet —the Liftmaster—on which extensive trials have now been completed in steelworks and foundries over a period of four years. The unit is claimed to have certain definite advantages over the conventional bolted design. It is of welded construction and moisture proof, and offers unusual dependability and a greater pick-up power for the nominal diameter. The peripheral face is completely free from projections. For the time being, the magnet will be manufactured in three sizes only, *viz.*, 52, 62 and 72-in. diameter. (The firm's standard circular lifting magnets will continue to be manufactured in a wide range of sizes, *i.e.*, 2 to 76-in. dia.)

FIG. 1.—*Checking possible core shift, using the ultrasonic thickness gauge introduced by Branson Instrument, Incorporated, Connecticut, USA. The varying wall-thicknesses are indicated on the direct-reading scale on the right.*

Foundry in a Public School

*Plant and Facilities at Oundle, described by Mr. J. France**

Shortly after Mr. F. W. Sanderson was appointed headmaster of the Oundle School, Northants, in 1892, he started the first workshop. Thanks to his lead, and later work, the School is regarded as a pioneer in the teaching of science and engineering. It is interesting to note at the outset that the whole idea of the project was not that of teaching engineering to the students, but of adapting workshop and laboratory practice to general education.

The aims of the first workshop at Oundle School, Northants, were (*a*) to secure a co-operative attitude towards practical work, (*b*) an understanding of the equal value to society of all boys, whether academically talented or not, and (*c*) while not abandoning strict discipline, to encourage boys to put forward their best effort by engaging their natural interests. To-day, with the foundations built up over sixty years, it can be claimed that the facilities at the Oundle School are almost unrivalled by schools of its type anywhere in the world.

* The Author is a student at Oundle School (see Fig. 3).

Original Foundry Building

The original foundry building—a gift by Mr. P. B. Brown of Hadfields, Limited—was erected by the students in 1921. It was equipped with a Green's emergency cupolette of 18-in. dia., a 50-lb. capacity non-ferrous furnace (made in the School), a sand mill and lever-testing machine (also made in the School) for testing cast-iron bars to destruction, and a sand-permeability testing machine (constructed in collaboration with the School's metallurgical laboratory). The moulding boxes for the foundry, and other essential pieces of equipment, were also made at the School.

At that time, iron castings were produced once a week, and aluminium, brass and gunmetal castings were made as required, usually three or four times per week. The various departments of Oundle School made a constant demand for the products of the foundry and this was supplemented by the requirements of local builders, garages and farmers.

By 1950, it was evident that the old foundry had become too

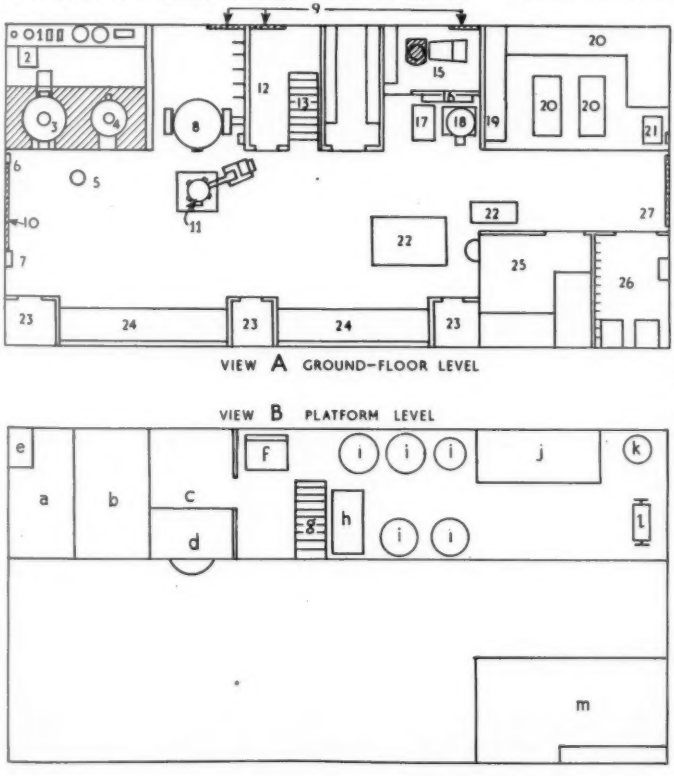

FIG. 1.—*Plan view of the foundry at Oundle School, showing the type and position of plant installed.*

Key: (1) shelf, (2) core oven, (3) 100-lb. furnace, (4) 60-lb. furnace, (5) sand tray, (6) control for air blasts and ventilating fans, (7) pyrometer meters, (8) large cupola, (9) doors, (10) emergency door with drop-bar release, (11) miniature cupola, (12) coke store, (13) staircase, (14) store, (15) compressor room, (16) showcase, (17) permeability apparatus, (18) Royer, (19) pattern cupboard, (2) benches for fettling, (21) grindstone, (22) storage space for moulding boxes, (23) sand pits, (24) moulding benches, (25) office, (26) changing room, (27) main door, (*a*) crucible store, (*b*) firewood store, (*c*) limestone, (*d*) chimney from cupolas, (*e*) extractor chimney from furnaces, (*f*) weighing machine (up to 4 cwt.), (*g*) staircase, (*h*) storage for boxes, (*i*) sand bins; (*j*) metal storage space, (*k*) paraffin drum, (*l*) buffer, (*m*) additional pattern storage.

FIG. 2.—*View of the* 100-*lb. and* 60-*lb. capacity furnaces in the foundry at Oundle School; note the storage platform above* (*and the tidiness slogan chalked on the wall*).

small, and it was no longer weatherproof. Experience gained from the running of it, however, had shown convincingly that foundrywork was of the utmost value in the teaching of general workshop practice, and a new building was erected and equipped.

FIG. 3.—*Small cupola, built by the students of Oundle School* (*the Author of this article is standing alongside*). *Part of the School's larger cupola can be seen in the background.*

NEW FOUNDRY

The new foundry (Fig. 1) has a floor space of 1,800 sq. ft.—approximately twice that of the old building—and at the planning and erecting stages, the opportunity was seized upon to provide an overhead platform, running down the length of the shop, to carry the raw materials to be used. A new cupola capable of supplying ¾ ton of cast iron per hr. was bought, and two new non-ferrous furnaces, of 100-lb. and 60-lb. capacities respectively, were also installed (Fig. 2). The remaining new plant consisted of a double-ended motorized grinder and a Pneulec Royer sand-conditioning machine. The twelve benches—with cast-iron tops and welded angle-iron frames—were made from material salvaged from the old building. (The whole of the floor of the old foundry was comprised of cast-iron plates, made in the foundry.) The fettling bay in the new building has a wood-block floor, though the remainder of the working floor is of concrete. More recently, the foundry was presented with an air-compressor and a complete range of compressed-air-driven tools by Holman Bros., Limited. These consist of chipping tools, rammers, drills, etc., and are proving most useful. As an experiment, the foundry was lighted by a mixture of mercury-vapour and tungsten filament lamps, and this has proved most successful.

Miniature Cupola

Perhaps the greatest achievement by the new foundry is that of the designing and building of a miniature cupola (Fig. 3). Although the large cupola installed in the foundry was most efficient, it was felt that a smaller one was required to cope with the many small jobs that were often cropping up. Work was started on this project in 1956, and with three years of experiment and experience behind, it is now felt that the students have perfected a very creditable piece of apparatus. Not satisfied, however, work is to be started shortly with a view to designing and fitting a recuperator system to this small cupola, and this should improve on its already quite outstanding performance. Some twenty successful runs have been made with the cupola and some four tons of ordinary and high-duty iron have been cast. It has recently been found that it is possible to obtain a cast of 70 lb. of metal from the furnace.

It should be noted here that with the sole exception of the 1-h.p. electric motor, the cupola has been constructed by the students entirely from scrap metal, using the facilities of the School's pattern-shop, foundry and metalworking shop. The cupola, which has a diameter of nine inches, has a lining made up of local refractory materials compounded to the School's own formula. The writer believes it is fair to claim that this cupola may well be the smallest in the world that is in regular use.

Work Undertaken

At present, up to about 20 boys at a time receive instruction at the hands of Mr. W. J. Taylor (originally from English Electric Company, Limited), who has now been the foundry instructor at the School for 31 years. With his wide and thorough knowledge of foundry techniques and his understanding of his pupils, his services to the foundry at Oundle are invaluable.

The work undertaken in the foundry is by no means limited to a narrow field. As in the other shops, during their two years' training, boys carry out standard jobs from the blue-print stage, starting with patterns they have made themselves in the patternshop. Subsequently, they machine and finish the castings in the metal shop. These jobs are designed to exercise boys in the basic techniques of workshop-practice and include the manufacture of hand tools (marking gauges, routers, vices, etc.), drill-stands and shooting sticks. After this basic training, boys in the foundry tackle a wide variety of jobs as the need occurs. For instance, their work may include the making, in iron, of desk legs for the School, firegrates, firebars for the School laundry, and sluice-gate winding-equipment for the Nene River Board, in addition to parts cast for a variety of testing machines that have been constructed for the School's engineering laboratory.

In the non-ferrous field, ornamental brasses, golf putters, and shields are popular, and a wide variety of castings are made for the various School departments as well as for outside sources (Fig. 4). A considerable amount of work, which has proved both valuable and successful, has also been done in the field of bell-founding. Recently, three preparatory schools have been equipped with bells made in the foundry. Although little was heard of it, the foundry produced some 18,000 castings of all descriptions for the war effort. New processes are continually being tried out in the Oundle foundry, and the newer techniques—such as shell moulding, lost-wax process and CO_2 Process—have all been demonstrated.

System of Working

The system on which the workshops are run today is briefly as follows: In each of the three terms in the academic year, every boy in the School has, at some time, one week away from normal school-work. For at least the first three years in the School, boys must spend this week under strict supervision in the workshops. More-senior boys may, instead of going into the workshops, spend this week doing something of their own choice, which is not included in the normal school curriculum. For their first two years, boys carry out standard jobs in the carpentry, foundry, patternshop and metal shop. All these different jobs are designed to train boys in the various aspects of workshop practice and their progress and ability is recorded on a simple card-index system. After the preliminary training, boys work on a wider variety of jobs, and a boy may, if he wishes, specialize in a particular department. In addition to his week in the workshops, once each term a boy may voluntarily attend workshops in the evenings of half-holidays in the winter terms.

FIG. 4.—*Examples of castings produced in the non-ferrous section of the Oundle School foundry.*

Among Public Schools, it is hardly surprising that Oundle School has, for many years, been popular with manufacturers who wish their sons to enter their businesses with a thorough grounding in engineering techniques. Amongst the Old Boys of the School are a number of prominent members of the Institute of British Foundrymen who received their introduction to the technique of casting metals in the Oundle School foundry.

Broom & Wade's New Belgian Company

Belgian subsidiary has been established by Broom & Wade, Limited, manufacturers of pneumatic equipment, etc., of High Wycombe (Bucks), as a result of increasing demand for "Broomwade" equipment installed in Belgium. Known as Broomwade-Belge, SA, the new company will not only control the requirements of Belgium, but also those of Luxembourg and the Belgian Congo.

At present the main purpose of Broomwade-Belge is to improve sales and servicing, but, with the European Common Market in mind, it will later assemble compressed units and portable plant locally, the compressors being supplied by the parent company.

Brighter Prospects for Iscor

Profits of the South African Iron & Steel Industrial Corporation, Limited, reflected the steel trade recession to the extent of nearly £2,000,000, falling for the year ended June 30, 1959, to £10,800,000 (£12,500,000). There is a much improved outlook for the current year, export orders totalling £11,000,000 having been received from 30 different countries. Japan, which bought 275,000 tons heads the list, with the US second with 120,000 tons.

Iscor's output in the past year was 93,000 tons up at 1,740,000 tons. Good progress was made with the £56,000,000 expansion scheme and new rolling mills are to begin operating in a year's time.

Overseas Foundry Standards

With a recent issue of *BSI News*, published by the British Standards Institution, 2, Park Street, London, W.1, was distributed a leaflet dealing with a number of overseas and Commonwealth standards. Amongst these were listed three of major interest to the foundry industry as follow:

From Spain comes news of standard *No. UNE 36-651, "Cupola Furnaces: Terminology."* This is a single-sheet leaflet carrying a sketch of a typical cupola and forehearth and the names, in Spanish, of 35 component parts. The standard should have considerable interest for equipment manufacturers in this country who intend to supply furnaces to Spanish-speaking countries.

The second standard selected for comment is *Indian Standard No. IS 1305-1958, "Specification for Graphite for use as Foundry Facing Material."* This is a six-page standard priced at Rs. 1.50, issued by the Indian Standards Institution (9, Mathura Road, New Delhi, 1) in March, 1959. It follows much the same format as British Standards specifications and deals in part one with general requirements—terminology, certificate of compliance, supply and independent test—and in part two, with specific requirements. For the material under consideration, the latter are characterized by a table of composition, detailing two grades, both of which have maximum moisture-content of 1.0 per cent. and volatile matter 3.0 per cent. The first of the grades can carry an ash-content of up to 20 per cent. and the second up to 30 per cent., fixed carbon making up the balance in each case. Sieve fineness of both grades is specified in Table 2 and after comments on sampling, packing and marking, there are three appendices describing test methods, sieve sizes and sampling procedure respectively.

Details of the Russian Standard

The third foundry-industry standard referred to in the BSI leaflet is a Russian publication numbered *GOST 2133-57* covering the *Classification and Basic Dimensions of Foundry Moulding Boxes for Hand- and Machine-made Moulds.* (Note: This does not cover boxes and jackets used in snap-flask moulding, or jackets for moulds composed of cores alone, or yet boxes for precision- or shell-moulding).

In view of the fact that the British Standard for moulding boxes is already several years old, it is interesting to examine this new Russian publication in some detail.

First as to classification, three types of foundry boxes are covered, namely, those wholly cast in steel, grey-iron and light alloys; those welded from standard and specially-rolled steel sections, in addition to incorporating cast-steel components, and lastly, those bolted up from steel and grey-iron parts.

(N.B. The use of composite boxes is allowed only when it can be proved that it is impossible to use boxes of the first two types). According to the interior shape, all boxes are grouped into oblong or square, round, or special—*i.e.*, wedge-shaped—boxes, the choice being controlled by technological conditions of casting and by shapes of patterns. In the publication, sketches are reproduced to show examples of shapes and to indicate the main dimensions; but it is pointed out that the illustrations are not to be used to indicate the construction of boxes. All the sketches, however, indicate that one round and one slotted hole are normal in Russian two-pin box-parts and that all the holes are bushed.

According to the weight of the moulding sand and the box-part, all moulds covered by the standard are divided into three categories, *i.e.* (1) hand lifted (box-parts up to 66 lb. and sand up to 66 lb.); (2) combined lift by hand and crane (box-parts from 66 to 132 lb. and sand above 132 lb.), and (3) crane lifted where both the box-parts and the sand are in excess of 132 lb.

In a further section, the way of making moulds is designated, *i.e.*, whether in boxes for use on machines, for slinging and hand-ramming, or for core assembly, and whether in pairs, threes, or multiple-section box types, cast horizontally or vertically.

In the most important section of the standard, basic dimensions in mm., for a very large range of box-parts are quoted in two tables, and boxes made in special shapes are also catered for. Here, a total of about 600 sizes of rectangular boxes ranging from 300 by 250 mm. (12 by 10 in.) to 10,000 by 5,000 mm. (33 by 17 ft.) and 42 sizes of round boxes are recorded, many of them in up to 12 different heights between two and 40 in. Then, as a basis for calculation of constructional elements for all types of boxes, it is stipulated that an "average dimensional value" equal to half the sum of the length and the width (or the diameter of round boxes) be applied to determine which of the range be wholly cast (in steel, grey iron or light alloys), which shall be welded (from standard rolled-steel sections, specially rolled shapes or from cast-steel elements), and finally, which shall be bolted up of steel or grey-iron parts. To conclude, distances between the centres of holes for pins are stipulated and it is stated that the diameters of locating pins should be in accordance with (Russian) Standard 2529-44.

Pianoforte Frames

The following excerpt is taken from Vo. 1, No. 4, of *Gray Iron Designer's Digest*, published by the Gray Iron Founders' Society (USA):—

Behind the craftsmanship, beauty and quality of tone, of all America's quality upright and grand pianos, is a grey cast-iron plate, which is as intricate in design as any machine part. The plate must have rigidity, a low coefficient of thermal expansion, exceptional damping qualities, and many other qualities that make it an outstanding engineering and design accomplishment. As the material that most ideally meets all the requirements, grey iron is preferred over all other metals. First, this material has high damping capacity so that it will not vibrate in resonance with the strings. The plate casting has excellent dimensional stability so that the instrument will maintain tuning. The coefficient of thermal expansion must be carefully synchronized with that of the strings so that tone pitch is maintained even with change in ambient temperature. The beads and "V" bearings on the plates are formed so that they have a hard surface as-cast and resist "bedding-in" of the strings. A piano plate casting must also be very strong to resist the pull of approximately 50,000 lb. exerted by the strings without continued distortion (creep).

"PROSPECTS IN THE STEEL INDUSTRY are growing brighter every day, with output moving up to a new all-time peak," said the Master Cutler, Mr. P. J. C. Bovill, speaking at the annual dinner of the Insurance Institute of Sheffield at the Cutlers' Hall, Sheffield on December 7. He said that the measure of progress was the unemployment percentage, which was now down to 1.1 per cent. The Master Cutler said that modern designs, vigorous salesmanship and competitive prices were the means to realising the opportunities that now faced Sheffield industry.

Report on the Annual Meeting of BCIRA

The need for more support from industry, in the form of increased grade B membership, was stressed at the 39th ordinary general meeting of the British Cast Iron Research Association, in London. A campaign for this purpose was suggested by the president, Mr. E. Player. The meeting included the presentation of the annual report, and other points dealt with—in addition to financial matters—were the election of the new president, vice-presidents, honorary members and Council.

The thirty-ninth ordinary general meeting of the British Cast Iron Research Association was held early last month, at the Connaught Rooms, Great Queen Street, London, W.C.2, with the president, Mr. E. Player, C.B.E., in the chair. On the proposal of Mr. C. C. Booth, seconded by Mr. H. G. Hall, the Minutes of the thirty-eighth ordinary general meeting, held in London on November 4, 1958, were approved and signed.

Report and Accounts

The President, presenting the thirty-eighth annual report* of the Council of the Association, and the accounts, for the year ended June 30, said that both had been previously circulated. The Report showed the immense amount of activity by the Association during the previous year, he said, and gave a clear picture of the tasks recognized as being in most urgent need of attention, of the means available for this work, and the Association's intelligent anticipation of future needs.

Need for More Support

After examining an analysis of the gross annual income handed to him by the secretary, the President then said that it was gratifying that the Association now had 272 Ordinary (B) Members in the United Kingdom, who were making a contribution of £23,519 1s. 1d. This represented something like 22.2 per cent. of the Association's total membership. The Association could not expect that all members, many of whom were small firms, would move into Grade B membership. When a new scheme was launched, there was a response from the more farseeing, or more generous, or more enthusiastic members, which was good evidence of the value of the scheme. After the initial launching, many members, unless constantly reminded, would let matters lie, although they were not opposed to the idea. Therefore, he hoped the Association would not allow this very important source of revenue to dry up by failing to remind people that they had not yet made the Ordinary (B) Grade. He said he knew how vital matters could become when competently managed. He felt that, money being so important to the Association as to everyone else, it would be good to have a campaign, not making the Association a nuisance to people, but pointing out to them that the BCIRA needed a great measure of their support. The industry had in the Association, he was proud to say, a model of what an organization of that kind could be.

MR. M. M. HALLETT, seconding the adoption of the report and the accounts, said the annual general meeting was the occasion when ordinary members were able to receive from the Council an account of their stewardship of the affairs of the Association during the previous year: as the president had said, the Council felt that the report was one of which they could be proud. The increasing expenditure was a sign of the demands made by the industry upon the Association and, of course, it was a healthy sign. During the past year their concern had been largely one of finance. Because of the growing stature of the Association, the Department of Scientific and Industrial Research had imposed on it rather stiffer terms on the financial side. These terms constituted a challenge, because the Department had held out the "carrot" of larger grants if the Association could help itself. That was what the Council was trying to do by introducing the Grade (B) membership scheme, and he endorsed the president's remarks on that matter. (The president having formally proposed that the annual report of the Council for the year ending June 30, 1959, and the accounts, showing the position of the Association's affairs as at June 30, 1959, be approved and adopted, the resolution was then seconded by Mr. M. M. Hallett, and carried unanimously.)

Election of Council

Council

On the proposal of MR. G. R. BUCKLEY, seconded by MR. K. MARSHALL, the meeting resolved that: (1) the following members of Council, retiring automatically under article 29, and eligible for re-election, be re-elected: Mr. C. C. Booth, J.P., M.I.MECH.E.; Mr. W. J. Colton, F.I.M., A.M.I.MECH.E.; Mr. E. C. Dickinson, M.MET., F.I.M., A.M.I.MECH.E.; Mr. F. V. Everard, M.I.MECH.E., J.P.; Mr. M. M. Hallett, M.SC., F.I.M.; Mr. R. L. Handley, B.SC.(TECH.), A.M.I.E.E.; Mr. W. H. Harper; Lt.-Colonel H. H. Jackson, O.B.E., J.P.; Mr. S. H. Russell, O.B.E., C.G.I.A., and Mr. G. R. Shotton, F.I.M.; (2) Mr. H. A. Redshaw, appointed a member of Council in July, 1959, in accordance with article 31, be elected, and (3) Mr. J. Bell, Mr. G. E. Lunt and Mr. C. H. Wilson be elected members of Council in accordance with article 25. The proposal was carried unanimously, and Mr. Marshall congratulated the Association on having such

* Published in the JOURNAL of December 3, page 545.

Annual Meeting of BCIRA

an able body of men to direct its affairs.

LT.-COLONEL JACKSON said that up to then he had been elected to the Council as a member of the Council of Iron Producers, but the meeting had now done him the honour of electing him a member of Council "under his own steam." He said he was very appreciative of that honour.

New President

MR. E. PLAYER proposed the election of Mr. C. R. Wheeler, C.B.E., as president of the Association in accordance with article 24. The retiring president said Mr. Wheeler was very well known to members and to the industry in general and would prove, he felt certain, a splendid servant and an ornament to the Association.

MR. N. P. NEWMAN, seconding, said that Mr. Wheeler was indeed very well known in the industry; in fact at the end of the last war he had been Iron and Steel Controller. He had been connected with the Association for many years and it could not possibly have a better president. Mr. Newman added that Sir Frederick Scopes, who had had to leave the meeting, had asked him to say that he wished to be associated wholeheartedly with the proposal. (Mr. Wheeler was then unanimously elected.)

Thanks to Retiring President

MR. S. H. RUSSELL then proposed that the warmest thanks be accorded Mr. E. Player, the retiring president, for his past services. Two years ago the Association had been faced with a dilemma, for the then president, Mr. J. J. Sheehan, had become a resident in Eire and was thereby disqualified, owing to unfortunate nationality regulations, from serving on the Council or in any office of the Association. Mr. Player then undertook the office of president for a year, to the great relief of the Council, and later agreed, though with reluctance, to serve for a second year. The Association had worked him rather harder than some presidents: in particular, he had presided at the function when a presentation was made to Dr. Pearce on the occasion of the latter's retirement as director of the Association. Later on, Mr. Player had inaugurated the Association's experimental cupola plant; he was a very busy man but always attended meetings, and had so guided the affairs of the Association that all connected with it were extremely grateful to him.

MR. H. J. V. WILLIAMS, seconding, said members would also wish to thank Mr. Player for his valuable assistance on the occasion when a deputation attended the Department of Scientific and Industrial Research. The proposal was accorded with acclamation, and Mr. Player briefly acknowledged it.

Vice-presidents

On the proposal of MR. P. A. RUSSELL, seconded by MR. T. M. HERBERT, the following were elected as vice-presidents of the Association in accordance with article 24: Sir William Scott, O.B.E., J.P., M.I.MECH.E., and Sir Henry Spurrier, M.I.M.E. Mr. C. H. Wilson, president of the Institute of British Foundrymen, was also elected a vice-president in accordance with article 24.

On the proposal of MR. A. E. PEARCE, seconded by MR. H. G. HALL, it was resolved that the warmest thanks of the Association be accorded to Mr. A. E. Peace for his work as vice-president, from which office he was now retiring in accordance with article 24. (The proposal was carried with acclamation.)

Honorary Members

MR. RICHARD MILES proposed the election of Dr. J. G. Pearce, C.B.E., and Mr. E. Player, C.B.E., as honorary members of the Association. He said that it was an extremely good thing for those concerned with the work of the Association to have old friends with them, particularly old friends with the experience and ability of Dr. Pearce and Mr. Player.

MR. R. L. HANDLEY, seconding, said the members were very conscious and appreciative of the work which the immediate past-president and the former director had done for the Association. He hoped they would accept the proposal in the spirit in which it was made; the members were grateful and were trying to express their gratitude. (The proposal was carried with acclamation.)

Dr. Pearce then said how gratified he was to be elected an honorary member. Mr. Handley had rather suggested that it might be intangible, but he could assure the meeting that it was none the less pleasurable. Following this, Mr. Player also thanked the meeting very much for the quite distinctive honour of his election, and said that he appreciated it very much.

Auditors

H. Overton, Salt & Company, chartered accountants, were automatically re-appointed auditors to the Association in accordance with section 159(2) of the Companies Act, 1948.

Votes of Thanks

Council, Committees and Sub-committees

MR. J. BELL proposed that the warmest thanks of the meeting be accorded to the Council, committees and sub-committees for their work during the year. The proposal was seconded by MR. G. E. LUNT, and the vote of thanks was heartily accorded.

Chairman

MR. H. A. REDSHAW proposed that the best thanks of the meeting be accorded to the Chairman for having presided.

MR. M. M. HALLETT, seconding, said that it gave him genuine pleasure to do so. The occasion was Mr. Player's "swan song," his last official act in his two years as president of the Association; although he had already been thanked for it, in thanking him for his chairmanship of the meeting, the members were thanking him also for the two years' outstanding service he had given them. Mr. Hallett added that he was proud to be the last speaker before Mr. Player vacated the chair. (The resolution was carried with enthusiasm, and Mr. Player briefly responded.)

Director and Staff

The PRESIDENT, paying tribute to the magnificent work of the director and his staff during the previous year, said that they, after all, were doing the executive work; the officers and committees could serve only in an advisory capacity. No matter how good a general might be, he could do little without an efficient army, he said, and the Association could congratulate itself on the good work done during past years under Dr. Pearce and now being carried on so well by Mr. Morrogh, the new director. More than anything else, that was responsible for the high regard in which the Association was held, he believed, and not only in England but all over the industrial world. Nearly everyone had to work for a living, but a major inspiration for all BCIRA staff, he was firmly convinced, was the urge to discover something new, to solve new problems, and to bring about further progress in the ironfounding industry. Salaries were, of course, of some importance, but such men as he had in mind did not work only for the sum they received. Their work was of consistently high quality even when it produced negative answers; that was the way of life. If progress were to be made, he continued, one had to realize that it was possible to learn more from apparent failure than from facile success. The struggle against the unknown laws of nature, the practical difficulties, and so on, were only too well known to the research staff, but they often came out of the struggle quite successfully, and it might be thought that the value of their work was beyond anything that could be bought for money. He asked the members to express appreciation of the services of Mr. Morrogh and his staff, and the hope that they would remain with the Association, in good health, for many years, to continue to contribute to progress. (The resolution was carried with enthusiasm.)

MR. H. MORROGH, the director, on behalf of his colleagues on the staff and himself, returned thanks for the chairman's kind expression of appreciation and the warm response of the meeting. He said that he and his staff were very well aware of, and grateful for, the continuous help and support which they received from the officers and Council and members of the various committees and sub-committees in discharging their responsibilities, and looked forward with pleasurable anticipation to tackling the many duties which they knew lay ahead. (This concluded the meeting.)

* * *

There was an informal luncheon after the meeting, at which MR. C. R. WHEELER, the newly-elected president, who had been unable to attend earlier, presided. He took the opportunity of acknowledging his election as president, which he described as a very great honour, also associating himself with the good wishes which the meeting had expressed to Dr. Pearce, and saying how much he had appreciated knowing him over the years.

WOLF ELECTRIC TOOLS, LIMITED, announce that their Bristol branch has moved to new and larger premises at 1-3, Dean Street, Bristol, 2.

New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s.)

809,133. Sintercast Corporation, 134, Woodworth Avenue, Yonkers, 2, New York, USA.

Production of hollow bodies, in particular of hollow thermal elements such as turbine blades, buckets and nozzle vanes, which are subjected to high stresses at high operating temperatures under corrosive conditions. The inventors employ a combination of powder metallurgy using titanium carbide and interstitial casting also known as infiltration.

809,270. Deutsche Gold und Silber Scheideanstalt Vormals Roessler, 9 Weissfrauenstrasse, Frankfurt (Main), Germany.

In the charging of high-vacuum induction furnaces, the inventors claim a method in which the use of the charging lock chamber and the manipulations associated with it, are obviated, and the free drop of fresh material into the crucible is avoided.

809,283. Lev Petrzela, Brno, Czechoslovakia.

The recovery of moulding sand and waterglass from waste sand obtained from cast moulds or cores prepared from a mixture of these substances and hardened by the action of carbon dioxide. This process is described in B.P. 654,817. The waste sand is heated to above 400 deg. C., so as to cause the hydrated silica to combine with the alkali-metal-carbonates to form a mixture of alkali-metal-silicate and sand. This silicate is then dissolved in water hydrothermically at a temperature above 100 deg. C., and at a pressure exceeding atmospheric pressure by more than 0.1 kg. per sq. cm.

809,540. J. B. Brennan, 13018 Lake Shore Boulevard, Cleveland, 8, Ohio, USA.

Castings of titanium or similar metals and their alloys.

809,629. H. J. Daussan, 9 Avenue Leclerc de Hautecloque, Metz (Moselle), France.

This invention relates to the casting of metals or alloys giving rise to gas or fumes. Examples given are of effervescent steel which gives off carbon monoxide, and also the sulphur, lead, lead-sulphide, and phosphor-steels. The distinctive feature of this process is that in the course of casting the emanations are collected in a gas-trapping chamber, carried by an apertured float which floats on the bath of molten metal.

809,954. Metropolitan-Vickers Electrical Company, Limited, 1-3 St. Paul's Churchyard, London, E.C.4.

An improvement in this company's lost-wax process, patented in specification B.P. 722,816. Under this new invention, only the initial coating is formed from a material comprising a filler of refractory material (e.g. zirconium silicate), suspended in a silica sol.

* * * *

647,784. "Improvements in or relating to hoppers, storage bins and like containers, and apparatus controlling the delivery of material therefrom." This patent was revoked by order of Court dated July 27, 1959.

Mr. K. G. HARRIS has been elected a fellow of the Institution of Metallurgists.

British Blast Furnaces in the September Quarter, 1959

(These tables are published through the courtesy of the British Iron and Steel Federation.)

Derbyshire, Leicestershire, Notts, Northants, and Essex.

Name of firm.	In blast at end of the third quarter, 1959.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Ford Motor	—	—	1	—	1	1	1
Holwell Iron	—	—	1	—	1	1.9	4
Kettering Iron & Coal	—	—	—	—	—	—	2
Renishaw Iron	—	—	1	—	1	1.6	2
Sheepbridge	—	2	—	—	2	2	2
Stanton Ironworks: Stanton-by-Dale	—	—	4	—	4	3.3	5
Staveley Iron & Chemical	—	—	3	—	3	3	4
Stewarts and Lloyds: Corby	—	4	—	—	4	3.9	4
Wellingboro' Iron	—	1	—	—	1	1	3
TOTAL	—	7	10	—	17	17.7	27

Lancashire (excl. N.-W. Coast), Denbighshire, Flintshire, and Cheshire.

Brymbo Steel Works	—	—	—	—	—	—	1
Darwen & Mostyn Iron	—	—	—	1	1	1	2
Lancashire Steel Manufacturing	—	2	—	—	2	2.9	3
Summers, John	—	2	—	—	2	1.9	2
TOTAL	—	4	—	1	5	5.8	8

North-West Coast.

Barrow Ironworks	2	—	—	—	2	1.1	4
Charcoal Iron	—	—	—	—	—	0.5	1
Millom Hematite Ore & Iron	2	—	—	—	2	2	2
United Steel: Workington	3	—	—	—	3	3	3
TOTAL	7	—	—	—	7	6.6	10

Lincolnshire.

Appleby-Frodingham Steel	—	3	—	—	3	3	4
Lysaght's Scunthorpe Works	—	3	—	—	3	3	3
Thomas, R., & Baldwins: Redbourn	—	2	—	—	2	2	3
TOTAL	—	8	—	—	8	8	10

North-East Coast.

Consett Iron	—	3	—	—	3	2.3	3
Dorman Long (Steel): Acklam	—	2	—	—	2	2	4
Redcar	—	—	—	—	—	—	2
Bessemer	—	—	—	1	1	1	3
Clay Lane	—	2	—	—	2	2	2
Gjers, Mills	2	—	—	—	2	2	3
Normanby Iron Works	—	—	—	—	—	0.3	3
Skinningrove Iron	—	2	—	—	2	2	3
South Durham Steel & Iron: West Hartlepool	—	2	—	—	2	2	2
Cargo Fleet	—	2	—	—	2	2	3
TOTAL	2	13	—	1	16	15.6	28

Scotland.

Bairds & Scottish Steel: Gartsherrie	1	1	—	—	2	2	3
Carron	—	—	1	—	1	1	4
Colvilles: Clyde Iron Works	—	1	—	—	1	1	3
Ravenscraig	—	1	—	—	1	1	1
Dixon's Ironworks	—	—	—	—	—	—	6
TOTAL	1	3	1	—	5	5	17

South Wales and Monmouthshire.

Guest Keen Iron & Steel: Cardiff	1	2	—	—	3	3	4
Thomas, R., & Baldwins: Ebbw Vale	—	3	—	—	3	2.5	3
Steel Company of Wales: Margam	—	5	—	—	5	4.1	5
TOTAL	1	10	—	—	11	9.6	12

Scots Foundries to Close

The Mirrlees Watson Company, Limited, Glasgow, are closing down two of their three foundries on March 1 next year. The foundries are at Laidlaw Street, Glasgow, and the one attached to the engineering works at the subsidiary company, Pott, Cassels & Williamson, Limited, Motherwell. Foundry production to meet the needs of the group is to be concentrated at the works of another subsidiary company, Blairs, Limited, Govan, Glasgow. Between 60 and 70 men are employed at the Laidlaw Street foundry and less than half that number at the Motherwell foundry.

Difficulties

Mr. J. Malley, managing director of the Mirrlees Watson Company, said: "In a modern engineering industry it is a little difficult to maintain the foundry capacity one used to maintain or tried to maintain in the past." There were different reasons for the two foundries being closed. The Motherwell foundry was an old one, and modernization would be too costly. Because of output, he said, it would have been difficult to maintain it in a competitive position. At Mirrlees Watson, however, the situation was different. There was a tendency to-day to welded construction which was taking away business from the foundry trade. Tied foundries were not in a position to compete with free foundries, and quite a number of companies specialized purely in foundry work. The group manufacture sugar machinery, chemical plant, condensing plant, pumps and water-distilling plant, etc.

Shipbuilding Record

A Clyde shipyard, Connell's, of Glasgow, has completed an ore-carrying motorship, Craigallion, in only 30 weeks—an achievement of which any yard would be proud. It is far ahead of normal British standards, and faster than Continental and Japanese times.

This shipyard has spent a great deal of money on modernization, and construction methods are among the most up to date in the country. An important factor in the company's success is that the men have co-operated wholeheartedly in introducing new machines and techniques. This is in sharp contrast with some other yards where modernization has brought trouble rather than progress.

Connells' are not working at this speed because they have fatter order-books than any other yards; they have work only until early 1961. They are, however, far-sighted enough to realize that nothing will be gained by taking their time over the work that they have. They know they must attract new orders; and this they do by working willingly with the most modern methods.

British Blast Furnaces in the September Quarter, 1959—*continued*

Staffordshire, Shropshire, Worcestershire, and Warwickshire.

Name of firm.	In blast at end of third quarter, 1959.					Weekly average in blast.	Total existing at end of quarter.
	Hematite.	Basic.	Foundry and forge.	Ferro-alloys.	Total.		
Goldendale Iron	—	—	1	—	1	1	2
Lilleshall Iron & Steel	—	—	—	—	—	—	2
Shelton Iron & Steel	—	2	—	—	2	2	3
Stewarts and Lloyds: Bilston	—	1	—	—	1	1	2
TOTAL	—	3	1	—	4	4	9
Sheffield.							
Park Gate Iron & Steel	—	2	—	—	2	2	2
GRAND TOTAL	11	50	12	2	75	74.3	123

Weekly Average Number of Furnaces in Blast during the September Quarter, 1959, and the Previous Four Quarters

District.	1958.		1959.		
	Sept.	Dec.	March.	June.	Sept.
Derby, Leics., Notts., Northants, and Essex	19.2	20	20	18.8	17.7
Lancs. (excl. N.-W. Coast), Denbigh, Flint, and Ches.	7	6.9	6.9	7	5.8
Lincolnshire	9.1	9.5	8	8	8
North-East Coast	17.7	18	17.4	17	15.6
Scotland	7	6.7	6	5.8	5
Staffs., Shrops., Worcs., and Warwicks.	5	5	4.9	4	4
South Wales and Monmouth	10.9	10.4	9.5	9.6	9.6
Sheffield	2	2	2	2	2
North-West Coast	5.7	6	7.4	7	6.6
TOTAL	83.6	84.5	82.1	79.2	74.3

The following companies have furnaces in course of construction or rebuilding:—Lancashire Steel Manufacturing; Millom Hematite Ore & Iron; South Durham Steel & Iron (West Hartlepool); J. Lysaght's Scunthorpe Works; Bairds & Scottish Steel.

ESC Link with the Past

The lasting worth of quality castings is illustrated in the following article abstracted from an ESC *Information Bulletin*:—

Bells perpetuate the name of the English Steel Corporation, Limited,—or at least one of its forbears, Naylor Vickers & Company—throughout the world. A century ago, bell casting was a prominent activity of Naylor Vickers, Sheffield. In fact bells formed one of the first applications of the techniques of steel casting newly imported from Germany.

Records from those days indicate that those bells went far afield—not only for churches and chapels, but also for fire-alarms, lighthouses, steamships, schools, factories and plantations. From the occasional reports received by the Corporation of bells still in use and still tuneful, it is learnt that there is a Naylor Vickers bell, cast in 1866, in the Cathedral of the Pines at Rindge, New Hampshire, USA. This bell hung for many years in the townhall tower at Keene, New Hampshire. The Cathedral in which it is now set is in a beautiful grove of pines on a hilltop. It is non-denominational and is dedicated as a memorial to the dead of foreign wars.

Iron and Steel Developments in New Zealand

Australian mining and financial interests are reported to be prepared to invest in New Zealand's proposed iron and steel industry. A representative of these interests has called for an immediate survey of every known iron-sand deposit and coalfield, at an estimated cost of £250,000. If the evidence justified the project, expenditure on plant would be £NZ12,000,000 and in the following five years a further capitalization of £NZ25,000,000 would be needed to provide a steel plant to supply the Dominion with 75 per cent. of her steel requirements.

Survey results indicate that the Lake Taharoa is potentially the most important deposit of iron sands on the west coast of North Island, with an estimated 173,000,000 tons of sand. The Patea deposit contains 14,000,000 tons and Muriwai 17,600,000 tons of recoverable iron sand. At the mouth of the Marokopa river, recoverable iron sand amounts to 29,000,000 tons, but access is more difficult than elsewhere.

Pacific Steel, Limited, is to build a scrap-steel mill at Auckland at a cost of £NZ2,500,000. The mill will use metal now being exported and is expected to produce steel to the value of £2,000,000. Production capacity of the mill will be 40,000 to 50,000 tons of steel per year.

Mr. RICHARD MILES, who is chairman and managing director of Head, Wrightson & Company, Limited, has been appointed a director of Franco Signs, Limited.

Notes from the Branches

Northampton Section

The November meeting of the Northampton and district section of the Institute of British Foundrymen was the first of many to be held in the Lecture Theatre of the Wellingborough Technical College, due to the section's old meeting room in the Hind Hotel being no longer available. The speaker was Mr. J. L. Francis from Foundry Services, Limited, and the title of the lecture "A Study of Casting Defects." Mr. Burns, of the same firm, was also present and took part in the discussion. Defects under consideration included those of steel, light-alloys and bronze as well as grey iron.

Mr. Francis illustrated his talk with slides, and dealt first with skin finish and sand properties and moulding conditions necessary to avoid burning on and scabbing. He emphasized the need for selecting a sand which did not have a uniform grain-size and suggested that a grading should give at least 70 per cent. on three adjacent sieves. The grading should be fine enough to give adequate skin finish whilst being coarse enough to allow easy escape of steam and gases. So far as core-binders were concerned, Mr. Francis pointed out the importance of understanding not only the amount of gas which is evolved on casting but also the time taken to produce this gas with respect to the condition of the casting whether or not it be in its molten state.

Porosity in iron, steel and light-alloys was dealt with at some length, the mechanics of progressive solidification and mass solidification were also explained, and the use of external chills and their influence on cooling *pro rata* to their size and position was given in the shape of some simple formulae. After giving details of the Williams core for atmospheric feeding, Mr. Francis had to abandon the rest of his talk because of shortage of time, and what follows is a summary of the ensuing discussion, during which the members found Mr. Francis and Mr. Burns to be well on top of their subject, and prepared to handle questions in a most frank and straightforward fashion.

Discussion

A member who asked Mr. Francis for his opinion on the effectiveness of denseners inserted into bosses of automobile castings because, he said in his experience, porosity still occurred where denseners were used, received the reply from Mr. Francis that he doubted this and thought it more likely that moisture had been picked up on the chill and that the defect described was most probably trapped gas. Answering another member who asked for an explanation of the reason for porosity in thin sections of metal where the adjacent mass of metal was solid, Mr. Francis said he thought it possible that here again the defect might not be porosity but trapped gas. He also suggested that there was a possibility of local overheating of the core or mould or in other words a local "hotspot." Asked for comments on the use of silicon-carbide chills as opposed to cast-iron, Mr. Francis gave it as his opinion that silicon-carbide chills were undoubtedly useful especially from the point of view of continoous usage; their heat conductivity, however, was less than that of cast-iron.

Inoculation Effects

His opinion on the effects of inoculation on internal soundness was next asked for, and in reply Mr. Francis said that inoculation tended to contribute to internal porosity and spoke of recent work being done by the British Cast Iron Research Association on this subject, with regard to inoculants and their influence on increasing the number of eutectic cells. Following further discussion on this point he agreed that aluminium was present in most ferro-silicons and contributed towards the inoculation effect. There appeared to be a critical value of residual aluminium in cast-iron (0.01 to 0.02 per cent.) which gave rise to hydrogen porosity. The term "oxidized iron" was then referred to, and Mr. Francis was asked if he had experienced this condition. The speaker replied that the condition often referred to as oxidized iron arose from cupola operation which allowed iron to melt too close to the tuyeres. As a result the melting loss of silicon and manganese would be higher than normal. Also a higher sulphur pick-up would be obtained. Iron melted under these conditions had low flowing power, contained gas and often showed inverse chill.

Questioned on the benefit obtained by the use of strainer cores, Mr. Francis said he thought that strainer cores were a modified form of pencil gating. They were best applied at the bottom of the down gate where they functioned as a choke. To another question as to the effect of pouring times on the soundness of castings, Mr. Francis replied that generally speaking, slow pouring, consistent with producing castings free from trapped gas and misruns, was more likely to give a casting free from internal porosity than one poured more quickly.

Tees-side Branch

The Tees-side branch held its annual social evening on Friday, December 4 in Teesdale Hall, Thornaby-on-Tees. The guest of honour was Mr. C. H. Wilson, IBF national president, who, on behalf of the Tees-side Council, presented an inscribed silver cigarette-case to Mr. Frank Shepherd in appreciation of his services as past-president and—for 13 years until his retirement in April of this year—as secretary of the branch. The photograph shows, from left to right, Mr. Frank Shepherd; Mr. C. H. Wilson; Mr. T. Wolverson, branch president, and Mr. G. Morris, branch secretary.

London Branch Dinner

The illustrations above were taken at the annual dinner/dance of the London branch of the Institute of British Foundrymen, held at the Cafe Royal, Regent Street, last month (see JOURNAL, November 26). On the left, Mr. J. Bain, A.M.I.MECH.E., London branch president, and his wife (carrying bouquet) are receiving Mr. and Mrs. D. Cherry Paterson. In the second picture, Mr. C. H. Wilson (IBF national president) and Mrs. Wilson, who assisted at the reception, are greeting Mr. and Mrs. L. A. S. Harbourne. The function was attended by just over 300 and the dinner was followed by a minimum of speech-making, with light entertainment and dancing until midnight.

News in Brief

HADFIELDS, LIMITED, Sheffield, held the 51st annual dinner of the Ambulance Society of the firm on December 5. The Lord Mayor of Sheffield, Alderman A. V. Wolstenholme, who presented the prizes mentioned that Hadfields was the only firm in Sheffield with a full-time medical officer.

TWENTY MEMBERS of the Women's Advisory Council on Solid Fuel visited Newton Chambers & Company, Limited, in Sheffield on December 7 and 8. During their tour of the company's extensive works, the party saw every stage in the production of the Redfyre solid-fuel-heating appliances.

THE EAST ANGLIAN SECTION of the Institute of British Foundrymen is holding a meeting on December 21 in the Lecture Hall of the Public Library, Ipswich, commencing 7.30 p.m. The evening will be devoted to the showing of films, amongst which will be "Design and Patternmaking" and "Britain's Heaviest Steel Castings."

THE GLASGOW ENGINEERING FIRM of John Dalglish & Sons, Limited, have secured a Russian order worth £500,000 for a synthetic rubber plant for Siberia. Mr. John Dalglish, managing director of the company, who went to Moscow earlier this year to discuss the plant with the Russians, has just returned after a further three weeks in Moscow, where all the negotiations were carried out. The order will take about a year to complete.

A CONTRACT has been signed between Voest, AG, and the Wellman Smith Owen Engineering Corporation, Limited, for the exclusive co-operation between these two companies in the United Kingdom for the design, supply and erection of plant and equipment for the LD-steelmaking process. The contract was signed in Linz by Mr. Hitzinger and Sir Peter Roberts. The technical advice of these leading suppliers of steel plant and associated equipment will thus be available to British steelmakers.

"WE HAVE MORE ENGINEERING VACANCIES at Sowerby Bridge than we can fill," said Mr. J. B. Branch, youth employment officer for the Calder area of Yorkshire, at the meeting of the Calder Divisional Education Executive on December 4. He added that this was the reverse of conditions which obtained at Easter. Mr. Branch said that school-leavers in the area need have no fear of unemployment even during the bulge years. It was easier to place young people in employment to-day than at any time since 1954.

ASHMORE, BENSON, PEASE & COMPANY, LIMITED (a member of the Power-Gas group), Stockton-on-Tees, have received a contract valued at approximately £4,000,000 for the design, manufacture and erection of two complete blast furnaces for Richard, Thomas & Baldwins, Limited. The two furnaces will each have a hearth diameter of 30 ft. and will be installed at Spencer Works, near Newport, Monmouthshire, to provide iron for Richard, Thomas & Baldwins, Limited's, new integrated steelworks and strip mill.

JESSOP-SAVILLE, LIMITED, held the annual dinner of their Twenty-five Years' Service Association at the Brightside Works canteen, Weedon Street, Sheffield, on December 5. Mr. F. Wardrobe, a retired director, presented Mr. C. H. Price, the firm's purchasing agent, with a certificate and gift in recognition of 40 years' continuous service. Other 40 year certificates were presented by Mr. L. Chapman, chairman of the company, and new members were presented with watches by Mr. R. P. Wallace, managing director. There are now over 400 members of the Association.

TUBE INVESTMENTS, LIMITED, announces that its subsidiary, the Chesterfield Tube Company, Limited, has reached a "know how" agreement with the Superior Tube Company, of Norristown, USA, on the manufacture of beryllium. As a result of the agreement, the latter company will be supplied with the techniques of beryllium-tube drawing and finishing developed by the Chesterfield Tube Company and the TI research and development division, and the future

News in Brief

beryllium research programmes of the two companies will be co-ordinated with a full exchange of information.

Mr. E. W. HANCOCK, chairman of the Coventry Productivity Association, presided at the dinner, held on November 30, to celebrate the fifth anniversary of the formation of the Association. The dinner was given by the Lord Mayor of Coventry, Ald. W. H. Edwards. Mr. C. Taylor, vice-chairman of the Coventry Association and divisional organizer of the AEU, said that no sane and reasonable person doubted the need for increased productivity. The trade union movement realized it and was prepared to give its support. Increased productivity would mean improved standards of living.

THE GOVERNORS OF THE WORKS SCHOOL of Howard & Bullough, Limited, Accrington, have accepted a proposal of the Accrington Divisional Education Executive that the school be incorporated into the College of Further Education in September, 1960. The acceptance is subject to the understanding that students will receive the same facilities for studies and that representatives of employing firms shall have full facilities for practical consultation with the College staff. The Howard and Bullough School was opened in 1947 with 150 students on the roll. By this year, however, the number of students had fallen to 83.

THOUGH RENISHAW IRON COMPANY, LIMITED, is now part of the vast Tube Investments organization, the old traditions are being maintained. Recently one of these, the 177 years old ceremony of blessing the furnace, took place. The Rector of Eckington, the Rev. C. S. Branson and Eckington's Methodist Minister, the Rev. E. F. Willis, led the procession of choirboys through the works to the foot of the furnace. There, before a congregation which included company directors, trade union representatives and iron workers, the Rector blessed the furnace. After the blessing the furnace was re-lit.

DR. A. REES-JONES, general manager of Parkinson Cowan Appliances, Limited, Birmingham, stressed the vital rôle of the foreman in modern industry as an aid to sound industrial relations, when he addressed delegates to a conference organized by the Midland region of the Institute of Industrial Supervisors. Shop-floor supervision, he said, was a major element in the chain of management; the foreman had an important part to play in helping to increase productivity and it was essential that he be adaptable to changing techniques in engineering production and that he rejected outworn methods of management of men.

BIRMINGHAM UNIVERSITY FACULTY OF COMMERCE is to co-operate in a full-scale survey into the motor industry in the Midlands which is being undertaken by the Midland Regional Advisory Committee of the TUC, with the purpose of analysing the dependence of the West Midlands on the automobile industry. The survey will also cover ancillary industries such as foundry, drop forgings, springs, etc. It is anticipated that the findings of the survey will be used in framing policy concerning the automobile industry, especially in the siting of plants under the £150,000,000 expansion schemes which the industry is planning.

THE INCANDESCENT GROUP OF COMPANIES (which includes Incandescent Heat Company, Limited, Metalectric Furnaces, Limited, Controlled Heat and Air, Limited and Selas Gas & Engineering, Limited) has for many years supplied thermal engineering equipment *inter alia* to the foundry and metallurgical industries of South Wales. In the light of the present and future industrial importance of the area, the group has now opened an area office at 40, Newport Road, Cardiff ('phone: Cardiff 37715). It is under the management of Mr. J. W. Payne, who has been operating for the group in South Wales for the past two years.

NEW PREMISES of the Aston Aluminium Warehouse Company, Limited, in Clement Street, Birmingham, were officially opened by Mr. H. R. Murray Shaw, director of the Aluminium Industry Council, on December 1. The company, formed 10 years ago, operates as a distributor for semi-manufactured aluminium ready to be fitted, it also supplies certain specialities for the building trade. Two previous moves have been made by the firm owing to expansion of business. In the new premises, aluminium has been used as extensively as possible to illustrate the various ways in which the material can be used in building construction.

Mr. H. E. HILL, chairman of the Laycock Engineering Company, Limited, and of the Birfield group, who presented awards at the apprentices training centre at Laycock's Victoria Works, Millhouses, Sheffield, addressing the apprentices, said that "the only way to a secure future is for everyone to make the maximum contribution and to think more of what they are putting into work than of what they are taking out. If we are going to come unstuck in this country it will be because of the emphasis people are placing to-day on their rights without thinking nearly enough about their duty." Mr. H. G. Smyth, personnel manager, said that two out of three apprentices taking courses at the training centre passed their examinations, and this was above the national average. He added that while at present, apprentices did a full-time course for a year at the training centre before going to the workshops, the company was considering extending it to a two years' course, and this would mean extending the centre. Mr. Hill also attended the 12th annual dinner of the Laycock 25 Club, held at the Grand Hotel, Sheffield, when he made long-service presentations to ten employees who had each been with the company for 25 years.

Obituary

The death is announced of Mr. WILLIAM COTTON, managing director of William E. Cotton & Sons (Brassfounders), Limited, Hanley, Stoke-on-Trent. He was 45. He became senior partner in the firm on the death of his father 12 years ago.

The death has taken place of Mr. JOHN W. FINLAY, a former secretary of the Port Clarence works, Middlesbrough, of the Anderston Foundry Company, Limited. He retired in 1947 after 50 years with the company, having started in the Glasgow office, moving to Teesside in 1928.

A former works manager of Norton Industries, Limited, engineers, founders, metal merchants, etc., of Wolverhampton, Mr. FRED DARLING, has died at the age of 51. He went to Wolverhampton in 1937 to take up the post of engineer and shop supervisor with the Turner Manufacturing Company, Limited, diesel engineers, manufacturers of aircraft components and winches.

Mr. KENNETH MACLEAN BURDER, chairman and managing director of Messenger & Company, Limited, ironfounders and horticultural engineers, Loughborough, Leicestershire, since 1942, died on December 1, at the age of 77. His family first became associated with the company in 1874. His father was a former joint managing director while his only son, Mr. F. G. M. Burder, is at present a director. Mr. Burder was one of the oldest members of the Institute of British Foundrymen having joined in 1905.

'TWAS THE NIGHT BEFORE CHRISTMAS, AND ALL THROUGH THE SHOP...

Not a casting was stirring; production had stopped.
Then suddenly there appeared in a fiery display,
Jolly old Santa, in his jet propelled sleigh.

He called to the foreman standing there in the murk,
" It's your own homemade mixes that foul up your work ! "
Then he reached in his bag, and said, " Here's the trick !
A real gift to die casters—that's famous DIE SLICK."

" Fumeless and odourless, it's sweeping the nation.
9 to 12 cycles with just one application.
Five different grades that will spray on real fast—
For zinc or aluminium, magnesium or brass ! "

" It cleans up the castings, won't discolour or mar . . .
Try it out Boys. There's no better by far ! "
So the boys sprayed it on, and with greatest of ease,
The castings came out just as slick as you please.

Try out a gallon—what can you lose?
No sticking, non-staining, so easy to use !
Don't wait for Santa—make your own test,
We'll cancel the invoice if DIE SLICK's not best.

With acknowledgements to G. W. Smith & Sons, Inc., Ohio

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DIE SLICK
the industry's standard die lubricant

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foundry sands
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Richards
Mull Mixer

FOUNDRY PLANT BY **Richards**

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Phoenix Iron Works, Leicester Telephone 61237

Personal

Mr. T. H. BADNAGE, secretary of Alfred Herbert, Limited, has been elected a director.

Mr. A. J. WEBSTER has been appointed a director of the London Aluminium Company, Limited.

Mr. DENNIS MORETON has been appointed sales manager of the Villiers Engineering Company, Limited, Wolverhampton.

Mr. E. R. EVANS, a member of the staff of the British Cast Iron Research Association, has been elected a Fellow of the Institution of Metallurgists.

Dr. A. M. SAGE, B.SC., development manager, Alloys Division, of Union Carbide Limited, London, W.1, has been elected a Fellow of the Institution of Metallurgists.

Mr. D. N. STEELEY has been appointed sales manager of standard industrial motors at the engineering works of the General Electric Company, Limited, in Birmingham.

Mr. N. C. MACDIARMID, managing director of the Stanton Ironworks Company, Limited, has been elected a director of Stewarts and Lloyds, Limited, the parent company.

Prof. K. G. DENBIGH, Professor of Chemical Technology at Edinburgh University, has been appointed to the Chair of Chemical Engineering Science tenable at the Imperial College of Science and Technology, from October 1, 1960.

At the annual general meeting of the Gray Iron Founders' Society, Mr. ALBERT M. NUTTER was re-elected president; Mr. J. E. QUEST, vice-president and Mr. C. R. GARLAND, hon. treasurer. A new election is that of Mr. ROBERT W. WILDER.

Mr. P. A. CROOKE is leaving his present position with Fairey Aviation Company, Limited, to take up a new appointment as technical manager of the precision foundry at Holbrook Steelworks of Samuel Osborn & Company, Limited, Halfway, Sheffield.

Sheepbridge Stokes, Limited, of Chesterfield, Derbyshire—a member company of the Sheepbridge Engineering Group—announce the appointment of Mr. J. C. MORTON as their technical representative in the north and east area from Lincolnshire to the Scottish border.

Mr. C. R. WHEELER has been appointed chairman of the Guest Keen Iron & Steel Company, Limited, a subsidiary of Guest Keen & Nettlefolds, Limited. He succeeds Mr. K. S. PEACOCK, who owing to pressure of other commitments has retired from the chairmanship but remains on the board.

Mr. J. H. E. HEALE, who has been works manager at the Motherwell works of Metropolitan-Vickers, Limited, for the past five years, has received an appointment with A.E.I. (Woolwich), Limited, as from January 1. He has been with the former company for 30 years, 12 of which have been spent at Motherwell. His successor will be Mr. E. CAMPBELL, instrument and meter division, Trafford Park Works.

First appointment in the newly-established UK Operations organization of Massey-Ferguson, Limited, is that of Mr. LIONEL HARPER, a member of the board of Massey-Ferguson Holdings, Limited, who has been appointed assistant managing director of the new group. Mr. Harper has been associated with the company's development in Britain since 1937 and for the past seven years has been managing director of Massey-Ferguson (Great Britain), Limited, the company now being absorbed in setting up the new group.

Machine-tool Research ?

During the course of the debate on Government plans to enhance the role of science in industry and increase the use made of research, a number of criticisms were made of the lack of research in the machine-tool industry. MR. ANTHONY GREENWOOD (Lab.) thought that the position of the industry in a period of increasing automation ought to be receiving the most urgent attention of the Minister for Science.

MR. AUSTEN ALBU (Lab.) said there had been some very alarming reports recently about the backwardness of a number of industries—machine tools, textile machinery, and shipbuilding—in the use of scientific methods. Last year the British machine-tool industry recruited two graduates whereas the German industry recruited 500.

Did the Minister of Education really feel that, with his natural concentration upon his own job as Minister of Education, he was in any way qualified to argue with members who felt strongly about the DSIR report on machine tools? asked MR. FREDERICK LEE (Lab.).

Replying, SIR DAVID ECCLES, Minister of Education, said that no detailed charges had been made that not enough research was being done by the machine-tool industry, but the criticism was very insistent. The DSIR had secured the co-operation of 40 of the leading firms in the industry in carrying out a complete but confidential inquiry. It was not a question of putting an industry in the dock, but of getting its fullest co-operation so that things could be put right. The DSIR report was now being discussed with the industry and action was likely to follow.

ICI's Beryllium Plant

Powdered beryllium is potentially dangerous to the lungs and elaborate precautions to keep atmospheric contamination down to a safe level have been taken by Imperial Chemical Industries, Limited, at its new wrought beryllium plant—the first in Europe—which has just come into operation. More than 200 workers are employed in two shifts at the £1,000,000 plant to produce 7 tons a year of the metal, which is valued at about £160 a lb.

There are no windows in the operative section of the plant, and the air is filtered, heated, and exchanged every three minutes. Everyone in the contact area wears protective clothing, including breathing apparatus. Every week 3,000 air samples are taken to ensure that the presence of beryllium does not exceed 0.01 microgrammes per 100 cubic metres of air.

ICI has spent more than £10,000,000 on developing "new" metals—a new titanium plant having a capacity of 2,000 tons a year.

Institution of Works Managers

The increase in corporate membership and plans for doubling the present membership during the next four years, has led to the decision to create a new regional structure, it was announced at the annual general meeting of the Institution of Works Managers on November 27. The first two regional boards will be for the North and South of England; in due course a third for the Midlands will also be established, and later on there will be others. The boards will act as additional liaison between the branches of the Institution and the head office, and will deal with those matters which are of mainly regional interest. Five years ago there were five registered students taking the Institution's courses in works management, this number has now increased to 500. This year more than 100 were successful in the qualifying examinations.

To all our Friends—

Seasonal Greetings and Best Wishes for a Happy and Prosperous New Year

From

F. & M. SUPPLIES LTD.

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Company News

CONSETT IRON COMPANY, LIMITED—A 3 per cent. interim dividend is declared for the year to March 29, 1960. For the six months to end-March there was a 3 per cent. interim and a final of 1¾ per cent.

SPERRYN & COMPANY, brassfounders and finishers, etc., of Birmingham—The board is negotiating for more manufacturing space at the Birmingham works and orders have been placed for extra plant. The chairman, Mr. G. N. Sperryn, says that this, with the turnover increase, needs additional capital, which up till now has been met from group resources.

WRIGHT, BINDLEY & GELL, LIMITED, engineers and brassfounders, of Birmingham—In addition to maintaining its dividend at 6d. per 2s. 6d. share, for the year ended September 30, 1959, the company announces a special distribution out of investment profit of 4d. per share (nil) and proposes a one-for-one scrip issue. Group net profit is £23,766 (£47,958).

BRIGHTSIDE ENGINEERING HOLDINGS, LIMITED—For the year to September 30, 1959, there is a final dividend of 14⅜ per cent., making 17½ per cent. on doubled capital, against an equivalent of 20⅝ per cent., including a bonus equivalent of 5 per cent. for 15 months. There was a group net surplus of £418,136 (£563,321 for 15 months), after tax of £424,787 (£380,874 for 15 months).

CROMPTON PARKINSON, LIMITED, manufacturing electrical engineers, of Guiseley (Yorks)—Mr. A. Parkinson, chairman, told the annual meeting that he believed there would be a general increase in demand during the current year but that the company would be faced with intensified competition in many of those traditional fields from which it normally derived the principal part of its income.

STEEL & COMPANY, LIMITED, marine, heating and ventilation, and mechanical-handling engineers, etc., of Sunderland—The directors propose to create 4,000,000 ordinary 5s. shares and to capitalize £500,000 in a one-for-two scrip issue. Profits to date are lower than those of the same period last year. The directors expect that the interim dividend will be maintained at 10 per cent. on the increased capital. The total for the year to March 31, 1959, was 20 per cent.

JOHN I. THORNYCROFT & COMPANY, LIMITED, marine engineers, founders, transport equipment makers, etc., of London, S.W.1—Lt.-Cmdr. J. W. Thornycroft, deputy chairman and managing director, stated at the annual meeting that since the chairman's statement was circulated a substantial order had been received for Mighty Antars for Pakistan and some orders for oil vehicles from North Africa. The position was therefore somewhat better than indicated in the statement.

VERITYS, LIMITED, manufacturing electrical engineers, of Birmingham—The liquidator states that the realization of the company's assets which has been made will enable him in the near future to make an interim distribution to general creditors of the company of 13s. 4d. in the £. So far as he can ascertain at present, after making this distribution and paying the preferential creditors in full, he will not be able to make a final payment of more than 4s. in the £ to the general creditors. In these circumstances there will be a deficiency, so far as the creditors are concerned, and nothing will be available for distribution among the members of the company.

THOS. FIRTH & JOHN BROWN, LIMITED—As forecast at the time of the one-for-four scrip issue, the company announces a final dividend of 6 per cent. on the increased capital, which makes the equivalent of 9½ per cent. for the year ended September 30, 1959, against 8 per cent. Consolidated profit is lower at £4,275,066 (£5,060,293) after deducting £792,477 (£796,586) for depreciation and debenture interest and including investment income of £498,902 (£449,146). The balance after UK tax is £2,317,280 (£2,448,570), to which is added £350,000 (nil) unrequired tax.

Offer for the whole of the ordinary capital of BROWN BROS. & COMPANY, LIMITED, Edinburgh, hydraulic and marine engineers, on behalf of a consortium of shipbuilders has been accepted in respect of more than 90 per cent. of the ordinary shares and has become unconditional. The ordinary shares are not quoted. Members of the consortium are:—John Brown & Company (Clydebank), Limited; Cammell Laird & Company, Limited; Fairfield Shipbuilding & Engineering Company, Limited; Harland & Wolff, Limited; Swan, Hunter, & Wigham Richardson, Limited, and Vickers, Limited.

WHITEHEAD IRON & STEEL COMPANY, LIMITED—As forecast, the company is maintaining the 25 per cent. dividend with a final of 15 per cent. for the year ended October 3, 1959. Group profits, before tax, amount to £924,376, against £1,204,721. After a much reduced tax charge, the group's net income balance is higher at £605,317 (£587,503). The directors state that the figures confirm the forecast made in June, when the interim dividend was declared. The favourable trading results from June, 1959, onwards arising from full working time have offset the reduced profits in the earlier months of the year and have enabled the board to "show a very satisfactory result for the full year."

Board Changes

CHARLES CHURCHILL & COMPANY, LIMITED—Mr. G. E. K. Blythe has ceased to be a director.

JAMES H. DENNIS & COMPANY, LIMITED—Mr. G. J. H. Dennis has resigned as a director.

PETROFINA (GREAT BRITAIN), LIMITED—Mr. E. Roberts has been elected a director. He has been general sales manager since 1949.

UNIVERSAL GRINDING WHEEL COMPANY, LIMITED—Sir Samuel Beale has decided, in deference to his age, to retire from the chairmanship, although he will remain a director.

HIGH PRECISION EQUIPMENT, LIMITED—Mr. D. E. Greenaway and Mr. W. J. Bonner have been appointed directors of the company, a subsidiary of Associated Engineering, Limited.

GAS PURIFICATION & CHEMICAL COMPANY, LIMITED—Mr. G. S. Taylor, chairman and managing director of Grundig (Great Britain), Limited, a subsidiary company, has been co-opted to the board.

Recent Wills

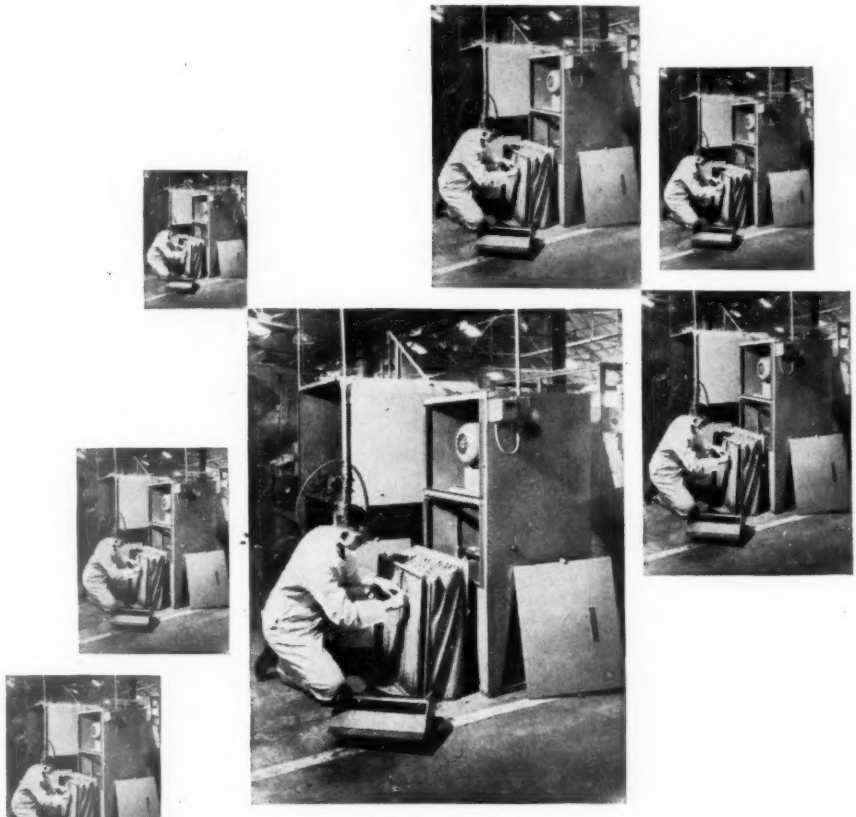
ROBINSON, J. A., of Mansfield (Notts), retired iron-founder £19,768

GILLIES, J. S., formerly outside manager of William Doxford & Sons (Engineers), Limited, Sunderland £1,666

PEARSON, THEOPHILUS, chairman of Pearson & Company (Chesterfield), Limited, manufacturers of firebricks and refractories £46,998

LANDELS, T. A., principal of T. A. Landels & Sons, Limited, engineers and millwrights, of Berwick-upon-Tweed (Northumberland) £8,153

CATTO, LORD, Governor of the Bank of England, 1944-49, and a director of the International Nickel Company of Canada, Limited, until 1940, when he became financial adviser to the Treasury ... £501,805



Look after the dust collectors—and the machinery will look after itself *(old Dallow Lambert proverb)*

If you have Dallow Lambert unit dust collectors in your factory, you can make sure they stay as efficient as they were the day you bought them by taking advantage of our Maintenance Service Scheme. This scheme, for which we make a small charge, provides for a service engineer to come round at least twice a year and thoroughly inspect your dust control equipment, making any repairs and replacements that may be necessary. This ensures that the equipment will continue to collect the dust produced by your machines, so that they can run with maximum efficiency and safety. It will also help to satisfy H.M. Inspector of Factories that you are doing your best to safeguard the health of your workers.

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I am interested in your Unit Dust Collector Maintenance Service Scheme: *I would now like*

further details by post ☐ a representative to call ☐

information about your range of products ☐

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ADDRESS .....

Tel. No. ....

For the attention of .....

. . . see us for dust *DALLOW LAMBERT* . . .

CRC 86

Publications Received

Survey of "C" Licensed Vehicles. Published by the Traders Road Transport Association, 146, New Bond Street, London, W.1; price 2s.

This 40-page well-documented Report covers the activities of 98,340 commercial vehicles. Probably the most important information given is set out in Table III, which details the reasons for using "C" licensed vehicles in preference to hired road haulage and rail transport. From this table it would appear that the underlying precept governing the choice of "C" licensed vehicles was giving real service to the customer; reduction in pilferage was another factor. In one case, the reviewer has been told, one company claims more from the railways for loss of goods than it pays them for transport, so, for certain classes of goods, loss by theft must be an important overall factor. Packaging costs too are stated in many cases to be reduced. All these facts are well known to British Railways and in common fairness it should be said that they are making strenuous efforts to make more efficient the services they give.

Raising Productivity in Smaller Firms. Published by the British Productivity Council, 21, Tothill Street, London, S.W.1; price 2s. 6d.

This booklet contains a dozen reports of an investigation into various aspects of firms, employing from six to 250 people, by the staff of the National Union of Manufacturers' Advisory Service, Limited (York Buildings, Adelphi, London, W.C.2). The reports deal with a number of activities ranging from plastics to small-scale floriculture, but no foundry investigation is included.

Metal Industries, Limited. Who we are, and what we do. Issued from Brook House, Park Lane, London, W.1.

Each page of this booklet is devoted to one of the companies in the Metal Industries group. They are treated alphabetically and often an illustration is incorporated to show a shop, a plant or a production. The ladle shown in the first picture looks a little the worse for wear! It is very useful to have this type of book showing the ramifications of a large industrial enterprise.

This is TI To-day. Published by Tube Investments, Limited, Adelphi, London, W.C.2.

This is a directory of the TI "empire," covering the activities of 52 companies, a number of special departments, and 18 overseas subsidiaries. It is a very useful publication as it is often difficult, even for those quite well versed in industrial matters, to remember the current "parentage" of firms though their names may have been familiar for many years.

Tiona V for Vitreous Enamels. Issued by Laporte Titanium, Limited, Hanover House, 14, Hanover Square, London, W.1.

This is technically a very interesting booklet as much information is given as to formulation of the enamel, reflectances, and colour. Especially useful are the cardinal points set out on pages 10 and 11 for enamel formulation.

Information Sheet, Series C Leaflets. Published by the Staveley Iron and Chemical Company, Limited, near Chesterfield.

This series of leaflets covers the application of Orthosil alkali chemical immersion cleaners. The cleaners are based on anhydrous sodium orthosilicate, Na_4SiO_4, and the various formulations are designed for use in vitreous enamelling, electroplating, phosphating, galvanizing and general engineering.

House Organs

Aluminium Courier, No. 47. Published by the Aluminium Development Association, 33, Grosvenor Street, London, W.1.

This issue is quite topical, as its appearance roughly coincides with the opening of the M.1 motor road, and the main articles deal with road signs and furniture. One picture, that of a road sign in Park Lane, London, is a good illustration of exactly how "not to do things." for the sign is placed just before a pedestrian crossing, which should take priority for drivers' viewpoint and attention. However, there is no fault in the sign itself, it is its siting by the Local Authority which the reviewer criticizes. The competition, organized by the Association for a design of lighting standards (recently described in the JOURNAL), is also fully covered by description and drawings. Altogether this issue is well produced and extremely interesting.

Ruston Review and Paxman News. Issued quarterly by the Ruston Group, Lincoln.

The reviewer was fascinated by the description in this magazine of "Europe's Largest Sewage Plant," actually the London County Council works at Beckton, Essex, which caters for 3,000,000 people living in an area of 112 square miles. For the operation of this, Ruston's supplied eight gas turbines running on sludge gas and were the main contractors for the whole plant. Another interesting story in this issue is that of the water supply for the city of Dar-es-Salaam, to the success of which Ruston plant very largely contributed. Altogether this is a very interesting publication.

Pulse, Vol. 1, No. 1. Published by Kelvin & Hughes (Industrial), Limited, Wembley Park Drive, Wembley, Middlesex.

No indication is given as to whether this interesting new magazine is to be published monthly or quarterly. It covers subjects which are demanding increasing attention by foundry interests, those of non-destructive testing and electronic instruments. Whilst most of our readers are familiar with the use of ultrasonics for testing for defects in welds and castings, it will come as a surprise that this medium is also used for ascertaining the amount of fat carried by breeding-pigs.

The Electric Tool User (Autumn, 1959). Published by Wolf Electric Tools, Limited, Pioneer Works, Hanger Lane, London, W.5.

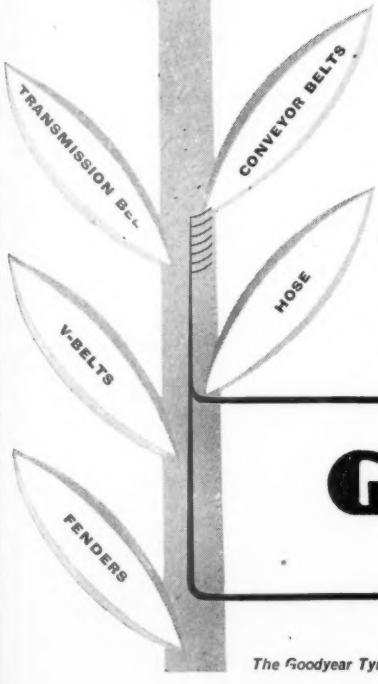
This magazine is designed to interest the reader in the multifarious applications in industry of electric tools. Thus its contents comprise short illustrated articles—ten in all—which cover the usefulness of the tools, *inter alia*, in mines, rolling mills, shipyards, and on the farm. The magazine is available to readers on writing to Pioneer works.

HUNGARY IS PLANNING to raise steel production from 1,600,000 metric tons in 1958 to an annual output of 2,400,000 tons in 1965—the end of the country's second five-year plan. Ironworks at Duna are to receive a new Martin furnace and the Ozd steel plant is to be fully modernized.

STEEL, PEECH AND TOZER, of Rotherham (a branch of the United Steel Companies, Limited), are to spend £10,000,000 on the replacement of all their existing open-hearth steel-melting furnaces by six electric-arc furnaces of 110 tons capacity each. It is said that when completed in about five years' time, it will be the largest electric steelmaking plant in the world with an annual capacity of 1,350,000 ingot tons of steel. It is the largest single development scheme in the branch's 80-year history.

From the Goodyear family tree

BELTING THAT TAKES A LOT OF BEATING



Whatever material you want to move, whatever the conditions, you'll find the conveyor belt for the job in the Goodyear family tree! For abrasive coke or hot sinter . . . oily materials or sharp stone . . . food and coal . . . a 'job-designed' Goodyear belt is your best choice for longest, low-cost performance. Special features include: good troughing, high impact resistance and flex life, and resistance to mildew. Get in touch with Goodyear now for Britain's most comprehensive conveyor belt service.

- Tough cover compounded to suit job
- Breaker fabric between cover and carcass—where required
- Plies of close-woven cotton duck, or synthetic fibres, mildew inhibited
- Skim coat between plies to increase flexibility, prevent separation
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GOODYEAR

THE GREATEST NAME IN RUBBER

The Goodyear Tyre & Rubber Company (G.B.) Ltd., Industrial Rubber Products Dept., Wolverhampton

Raw Material Markets

Iron and Steel

Outputs of most grades of pig-iron are maintained at satisfactory levels. The expansion in demand for basic steelmaking pig-iron has been met by increased production and the steelworks continue to receive sufficient supplies both for consumption and stock requirements. In the foundry grades high-phosphorus irons are the most easily obtainable, producing furnaces being well able to satisfy the needs of the foundries using these grades either from stock or current outputs.

The light foundries producing castings for the domestic utensil and the building trades maintain an improved demand for pig-irons and these foundries are able, with the work on hand, to obtain reasonably good outputs of castings. Many of the jobbing foundries are fairly well occupied, but the textile foundries are only moderately busy. On account of the easy supply position of the high-phosphorus irons there is little forward buying, current business covering only immediate consumption and working stock requirements.

For the engineering and speciality foundries producing those high-quality castings which necessitate the use of low-phosphorus irons, the present supply of these grades is not so easy. The heavier demands made on the furnaces for supplies, chiefly from the makers of castings for the motor vehicle trade, are, for some brands, in excess of available supplies, of which only a limited quota can be obtained. In consequence, other producers are booking more heavily and so far have been able to cope with the increased business. Delivery dates, however, have been extended.

It is expected that additional furnace capacity for the production of low-phosphorus irons will be available in the early part of next year when the supply position should be easier, and, with this in view, many foundries are covering for their needs for some months ahead. A fresh furnace producing low-phosphorus iron in the Derbyshire area is also expected to go into commission shortly.

In addition to the heavy demands for castings from the motor-car trade, the machine-tool industry is also specifying for castings more freely, and the foundries catering for them are obtaining much better outputs. A substantial tonnage is also being taken up by many other users of high-duty castings, but from collieries and railways demand continues moderate. Apart from the low-phosphorus irons, good quantities of hematite are also being taken up by the engineering foundries, so that makers of this iron are much busier. Refined iron makers are also disposing of larger tonnages of pig-iron.

There is a heavy demand for arisings of both steel and cast-iron scrap and suitable parcels are readily accepted. Foundry coke deliveries are satisfactory and ganister, limestone, and firebricks are available to requirements.

With their present order-books the re-rollers are very well employed and are obtaining good outputs of small bars and light sections, together with reinforcing rods. Demand is maintained at high levels, enabling the mills to operate on a full-time basis. The call for steel semis is substantial and home steelworks are fully committed for their outputs for some time ahead. Here again delivery dates are extended. All arisings at the steelworks of suitable re-rolling quality defectives and crops are readily acccpted by the re-rollers.

Non-ferrous Metals

The US strike position still dominates the copper markets on both sides of the Atlantic, but in a different way than previously. The American Smelting & Refining Company and the Mine, Mill and Smelter Workers' Union have reached agreement on local issues, as a result of which 11 of Asarco's plants have resumed operations. Furthermore, negotiations with Kennecott are reported to be going well. Nothing has been heard of Phelps-Dodge and Anaconda, but this does not really matter because if Kennecott comes to terms the rest of the producers will fall in line.

What will happen to the price of copper in London? This is a more difficult question to answer now than a week ago because, then, it appeared that the longshoremen would come out on strike so that no copper could be shipped to the United States to relieve the shortage. Now, the longshoremen's strike is virtually settled, so that a fair demand for copper from London could build up while the US copper mines are getting back into their stride. If this is reasonable, then it is also reasonable to conclude that the price fall will not be so sharp as it would have been. However, the Christmas holiday period is a slack time and demand naturally falls away and so it must be concluded that the copper price in London will take some time to recover its recent high price levels. Anyway, demand is satisfactory both from the UK and from the Continent and once the US copper producers and custom smelters can sell and buy metal, market prices—as between London and New York—can be put on a realistic basis. As the moment, US producers are quoting 33 cents with no copper to sell, and custom smelters are still unquoted.

Tin is an unsettled market in London and weak in both America and in the East. The fact is that the market has not quite made up its mind about the Tin Council's decision to raise the next quota by 6,000 tons to 36,000 tons. Moreover, this news was followed last week by the statement that the buffer stock would not be holding less than 10,000 tons of tin by the end of this year. Meanwhile, and up to the end of June, 1960, the buffer stock manager can operate in the market between £780 and £830 a ton. At the end of the next June the council will be considering a new draft agreement, as the present one expires on June 30, 1960. Singapore is weak, with the price fluctuating sharply. This has had its effect on the London market, which is, at best, only quietly steady. In the US demand is patchy, but better, and the price is trying hard to rise to $1 a pound.

Lead remains lifeless on both sides of the Atlantic and stocks are substantial. The US price (New York) is now 12.50 cents a pound, against 13 cents previously. The East St. Louis price is 12.30 cents, against the previous 12.80 cents.

Zinc prices in London on Monday were sharply depressed by a market rumour that a further release of Board of Trade metal was likely. Earlier, zinc had continued steady with overall demand satisfactory. The US market is steady and waiting for further developments from the steel industry negotiations. The US price is called 12½ cents a pound, East St. Louis.

NEGOTIATIONS ARE proceeding between Elliott-Automation, Limited, London, W.1, and Manufacture de Machines Du Haut-Rhin, SA ("Manurhin"), Mulhouse, France, with a view to the manufacture in France of Elliott-Automation equipment. It is proposed that Elliott-Automation will take a financial interest in Manurhin.

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Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

December 15, 1959

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P, 10-ton lots or over, £23 5s. 0d., delivered Birmingham, £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over: N.-E. of England (local iron), £24 14s. 0d.; Scotland (Scotch iron), Zone S.1, £25 0s. 6d.; Sheffield, £26 2s. 6d.; Birmingham, £26 9s. 0d.; Wales (Welsh iron), £24 14s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £41 10s. 0d. to £44 0s. 0d., scale 15s. 0d. per unit, lumpy; 75 per cent. Si, £57 0s. 0d. to £62 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 11s. 7d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 14s. 7d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £78 10s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £77 0s. 0d. to £80 10s. 0d., basis 60 per cent. Cr, scale 26s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent, C,* 1s. 8½d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9¾d. to 2s. 0¾d. per lb. Cr; 0.06 per cent. C,* 1s. 10¼d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £245 0s. 0d.; 96/98 per cent., £275 0s. 0d.

Ferro-columbium.—65/67 per cent., Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £63 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., 100 tons & over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 6 to 35 tons, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), under 10 tons, £34 17s. 0d.; silico-manganese, under 10 tons, £43 16s. 6d.; free-cutting, under 10 tons, £36 14s. 6d. SIEMENS MARTIN ACID (under 10 tons): Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

Billets, Blooms, and Slabs for Forging and for Stamping (under 10 tons).—Basic, soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

* Average 68-70 per cent.

FINISHED STEEL

Heavy Plates and Sections (under 10 tons).—Ship plates, (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £68 5s. 0d.

Alloy Steel Bars.—1 in. dia. and up; Nickel, £68 10s. 0d.; nickel-chrome, £99 4s. 0d.; nickel chrome-molybdenum, £111 17s. 0d., in lots of 5 tons to under 10 tons.

NON-FERROUS METALS

Copper.—Cash, £252 0s. 0d. to £252 10s. 0d.; three months, £236 0s. 0d. to £236 10s. 0d.; settlement, £252 10s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 5⅝d. per lb.; rods, 275s. 6d. per cwt. basis; 20 s.w.g., 310s. 6d. per cwt.

Tin.—Cash, £787 10s. 0d. to £788 0s. 0d.; three months, £781 10s. 0d. to £782 0s. 0d.; settlement, £788 0s. 0d.

Lead (Refined Pig).—First half December, £71 15s. 0d. to £71 17s. 6d.; first half March, £71 10s. 0d. to £71 12s. 6d.

Zinc.—First half December, £96 0s. 0d. to £96 5s. 0d.; first half March, £90 10s. 0d. to £90 15s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £132 5s. 0d.; rolled zinc (boiler plates), all English destinations, £130 0s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £107 10s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 2s. 0⅝d. per lb.; sheets to 10 w.g., 224s. 3d. per cwt.; wire, 2s. 10½d.; rolled metal, 224s. 3d. per cwt.

Brass (Brazing).—BS1400, B3, — ; B6, — .

Brass (High Tensile).—BS1400, HTB1, — ; HTB2, — ; HTB3, — .

Gunmetal.—BS1400, LG2, — ; LG3, — ; G1, ½%, — ; G1, 1%, — .

Phosphor Bronze.—BS1400, PB1 (AID released), — ; BS1400, 90/10/1, — .

Leaded Phosphor Bronze.—BS1400, LPB1, — .

Phosphor Bronze Strip, etc.—Strip, 313s. 9d. per cwt.; wire, 4s. 3¼d. per lb.; rods, 3s. 6¾d.; tubes, 3s. 6¾d.; chill cast bars; solids 3s. 6¼d.; cored 3s. 7¼d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 4s. 0d. per lb.; round wire, 10g in coils (10 per cent.), 4s. 5d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 4d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 0d. to 2s. 3d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £71 10s. 0d. to £72 0s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, — ; AB2, — .

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Imports and Exports of Iron and Steel in October

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in October. Totals for the first ten months of this year and last are also included.

Total Exports of Iron and Steel

Destination.	Month ended Oct. 31.	Ten months ended Oct. 31.	
	1959.	1958.	1959.
	Tons.	Tons.	Tons.
Cyprus	96	4,810	1,339
Sierra Leone	626	10,497	8,543
Ghana	1,635	12,832	22,680
Nigeria	9,253	54,521	64,187
Union of South Africa	3,501	80,679	34,095
Rhodesia and Nyasaland	2,270	29,074	17,724
Tanganyika	1,407	12,072	16,648
Kenya	3,898	33,950	21,413
Uganda	245	2,663	3,513
Mauritius	332	2,775	1 420
Aden	503	2,531	2,708
Bahrein, Qatar, and Trucial States	573	7,464	6,557
Kuwait	1,183	35,175	9,153
India	28,819	121,008	167,192
Pakistan	5,749	47,841	36,354
Singapore	1,589	28,399	18,811
Malaya	724	12,851	8,594
Ceylon	1,410	23,473	32,846
British North Borneo	399	1,729	2,269
Hongkong	6,008	47,907	55,360
Australia	8,604	84,312	68,145
New Zealand	10,137	153,737	81,896
Canada	26,475	151,933	175,018
Jamaica	2,076	17,826	18,053
Trinidad	3,621	41,512	34,545
British Guiana	506	5,971	5,473
Other Commonwealth countries	2,792	34,095	29,734
Eire	4,445	40,453	39,883
Soviet Union	7,261	15,967	28,566
Finland	3,932	41,148	30,261
Sweden	14,871	101,464	104,040
Norway	9,240	76,358	77,955
Denmark	9,723	71,369	78,596
Western Germany	11,088	44,100	101,680
Netherlands	9,259	67,313	80,466
Belgium	2,976	30,601	30,948
France	2,509	3,747	5,041
Switzerland	656	8,023	7,313
Portugal	1,198	11,815	12,808
Spain	2,280	38,028	23,734
Italy	2,171	35,468	40,048
Austria	799	8,491	3,444
Yugoslavia	1,667	3,440	4,281
Greece	1,370	11,271	9,608
Turkey	239	3,778	4,710
Netherlands Antilles	963	1,762	2,955
Portuguese East Africa	75	2,233	1,251
Egypt	1,058	11,793	3,208
Sudan	386	29,618	6,101
Lebanon	685	8,636	3,054
Israel	1,013	6,548	12,312
Saudi Arabia	83	3,665	2,949
Iraq	11,255	31,491	69,325
Iran	9,186	33,012	32,439
Burma	925	9,671	7,582
Thailand	939	5,937	7,235
Indonesia	1,824	1,759	5,877
Philippine Republic	610	2,999	6,759
USA	25,552	69,534	159,307
Cuba	904	5,238	6,140
Colombia	932	5,072	3,705
Venezuela	4,133	58,903	58,428
Ecuador	37	2,158	848
Peru	219	9,183	2,223
Chile	173	4,348	1,236
Uruguay	721	824	1,492
Argentina	18,819	112,257	180,737
Other foreign countries	65,703	107,326	279,643
TOTAL	356,310	2,198,438	2,482,458

Total Imports of Iron and Steel

From	Month ended Oct. 31.	Ten months ended Oct. 31.	
	1959.	1958.	1959.
	Tons.	Tons.	Tons.
Rhodesia and Nyasaland	357	5,627	4,413
Canada	2,145	18,304	15,452
Other Commonwealth countries and Eire	4,860	19,674	31,675
Soviet Union	2,411	108,929	44,448
Sweden	3,621	29,600	24,953
Norway	9,120	59,799	71,389
Poland	439	173	4,162
Western Germany	9,051	61,807	62,882
Netherlands	12,192	119,250	134,626
Belgium	2,213	86,282	19,116
Luxembourg	623	5,784	5,536
France	1,839	16,721	18,231
Italy	655	6,780	11,628
Austria	319	3,746	3,476
Japan	50	2,996	2,008
USA	1,126	114,878	20,739
Other foreign countries	636	6,852	9,811
TOTAL	51,657	667,202	484,545
Iron and steel scrap and waste, fit only for the recovery of metal	49	61,758	2,518

Exports of Iron and Steel by Products

Product.	Month ended Oct. 31.	Ten months ended Oct. 31.	
	1959.	1958.	1959.
	Tons.	Tons.	Tons.
Pig-iron	13,540	120,743	118,456
Ferro-columbium (niobium)	16	31	55
Ferro-tungsten	131	629	1,000
Other ferro-alloys	1,199	2,991	7,202
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms	11,479	12,889	71,573
Pieces roughly shaped by forging*	156	6,188	1,342
Iron bars, rods, angles, shapes, and sections	1,612	1,467	3,177
Steel bars, rods, angles, sections, and shapes	82,942	270,858	403,058
Iron plates and sheets	1,251	1,383	1,532
Universal plates	1,066	3,574	7,867
Steel plates, 3mm. and under 4.5mm. thickness	3,634	7,021	34,436
Ditto, 4.5mm. or more in thickness	27,631	146,626	170,799
Blacksheets and blackplate	30,500	233,544	230,953
Hoop and strip	7,521	62,626	69,249
Tinplate	39,118	307,795	388,882
Decorated tinplate	785	3,564	7,278
Galvanized sheets	6,935	65,722	71,939
Other (incl. tinned sheets, terneplate, and ternesheets)	3,064	11,363	18,069
Railway and tramway construction material	24,468	202,404	140,835
Wire rods of steel (incl. alloy steel)	5,198	39,425	41,155
Wire	10,429	84,066	88,855
Tubes, pipes, and fittings	83,635	613,529	604,746
TOTAL	356,310	2,198,438	2,482,458

* The figures for 1959 are not completely comparable with those for previous years.

DAMAGE estimated at about £200 was caused when fire broke out at the premises of H. E. Lupton and Sons, Limited, ironfounders, Accrington, Lancs, last month.

BIRMINGHAM UNIVERSITY has accepted the offer of Joseph Lucas, Limited, to finance a Fellowship in the field of metal joining in the Department of Industrial Metallurgy for seven years.